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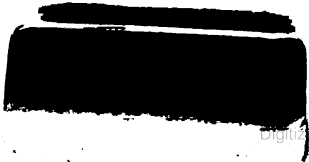
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REPORTS OF THE
DEPARTMENT OF THE INTERIOR

FOR THE FISCAL YEAR ENDED JUNE 30

1912

ADMINISTRATIVE REPORTS

IN 2 VOLUMES

VOLUME I

**SECRETARY OF THE INTERIOR
BUREAUS, EXCEPT OFFICE OF INDIAN AFFAIRS
ELEMOSYNARY INSTITUTIONS
NATIONAL PARKS AND RESERVATIONS**



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Administrative reports, in 2 volumes.

Vol. I. Secretary of the Interior.

Bureaus, except Office of Indian Affairs.

Eleemosynary institutions.

National parks and reservations.

Vol. II. Indian Affairs.

Territories.

Report of the Commissioner of Education, in 2 volumes.

II

185249

CONTENTS.

	Page.
Report of the Secretary of the Interior.....	1
Bureaus of the Interior Department	2
General review and recommendations.....	3
A comprehensive classification policy for the public domain.....	3
Homestead laws.....	6
Reclamation entries.....	7
Coal-land leases.....	8 ✓
Mining laws.....	10
Transportation and coal development in Alaska.....	12 ✓
Water power.....	14
Stream utilization.....	21
National irrigation policy.....	23
Lower Colorado River.....	30
Recommendations concerning Indian administration and other mat- ters.....	31
Office of the Assistant Attorney General.....	32
General Land Office.....	34
Public surveys.....	35
Texas-New Mexico boundary.....	36
Carey Act.....	36
State and Territorial grants.....	36
Railroad grants.....	36
Chippewa logging, Minnesota.....	37
Sales of Chippewa pine timber.....	37
Legislation.....	37
Commissioner's recommendations.....	37
Geological Survey.....	38
Need of survey building.....	39
Classification of the public lands.....	39
Geologic Branch.....	40
Topographic Branch.....	41
Water Resources Branch.....	41
Examinations under Weeks Act.....	41
Publications Branch.....	41
Administrative Branch.....	42
Reclamation Service.....	42
Bureau of Mines.....	45
Office of Indian Affairs.....	47
General administration.....	49
Removal of restrictions.....	51
Education and training.....	52
Taxation of Indian lands.....	53
Determination of heirships.....	54
Sanitation and health.....	54
Employment office.....	54
Enforcement of liquor laws.....	55

Report of the Secretary of the Interior—Continued.

	Page.
Office of Indian Affairs—Continued.	
Timber lands.....	55
Irrigation works.....	56
Grazing leases.....	57
Oil leases.....	58
Indian supplies.....	58
Traders' claims.....	58
Religious work among the Indians.....	59
Five Civilized Tribes.....	59
Tribal affairs.....	59
Individual affairs.....	62
Expenditures.....	64
Pension Office.....	64
Appeals in pension and bounty land claims.....	68
Patent Office.....	69
Bureau of Education.....	71
Territories.....	74
Alaska.....	74
Assessed valuation and taxes.....	75
Commerce.....	75
Mines and mining.....	75
Fisheries.....	76
Agriculture.....	77
Coal lands.....	78
Native inhabitants.....	78
Roads and trails.....	79
Aids to navigation.....	79
Territorial legislature.....	79
Public buildings.....	79
Governor's office.....	80
Hawaii.....	80
National Parks and Reservations.....	83
National monuments and preservation of American antiquities.....	85
Eleemosynary institutions.....	87
Government Hospital for the Insane.....	87
Freedmen's Hospital.....	89
Howard University.....	91
The Columbia Institute for the Deaf.....	92
Maryland School for the Blind.....	93
Superintendent of the United States Capitol Building and Grounds.....	93
General Education Board.....	94
Memorial to John Wesley Powell.....	96
Maritime Canal Company of Nicaragua.....	96
Appendixes.....	98
Report of the Commissioner of the General Land Office.....	105
Centennial.....	107
General statement.....	108
Cash receipts and expenditures.....	108
Area of land entered and patented.....	108
Organization.....	108
Salaries.....	109
Pensions.....	109
Correspondence.....	111

CONTENTS.



Report of the Commissioner of the General Land Office—Continued.	Page.
Formulation of charges.....	112
Agents' reports not considered in adjudicating cases where trial had.....	112
Field service.....	113
Alaska.....	114
California oil lands.....	116
Comparative statement of method of performance of work.....	118
New system of accounts for receivers of public moneys.....	124
Repayments.....	125
Surveying.....	125
Alaska surveys.....	127
Reestablishment of Texas-New Mexico boundary.....	128
Carey Act.....	128
Reservoir declaratory statements.....	130
Rights of way.....	130
Power site, etc., reserves.....	131
Railroad selections.....	131
State selections.....	131
Imperial valley lands.....	132
Swamp lands.....	132
Adjustment of the California school-land grant.....	133
Sunk lands and lake lands in Arkansas.....	133
Reclamation work.....	134
Homestead entries in forest reserves.....	135
Abandoned military reservations.....	135
Lieu selections for lands in Indian reservations.....	136
Indian allotments.....	136
Indian reservation openings.....	136
Lands of Choctaw, Chickasaw, and Creek Indians in Alabama and Mississippi.....	136
Ceded Chippewa pine, Minnesota.....	138
Opening of Chippewa lands to homestead entry.....	139
National forests.....	139
National monuments.....	140
Bird reservations.....	141
Legislation.....	143
Three-year homestead.....	143
Reclamation entries and water-right charges.....	144
Placer-mining claims in Alaska.....	144
Recommendations.....	144
Regulations of professional locators and pernicious literature in relation to public lands.....	144
Attendance of witnesses.....	146
Certified copies of records in surveyors general offices and local land offices.....	147
Statistics relating to the disposition of the public domain.....	149
Report of the Commissioner of Pensions.....	177
Commissioners of Pensions since 1833.....	178
General statement.....	179
Pensions of the several wars and of the peace establishment.....	186
Act of February 6, 1907.....	189
Act of April 19, 1908.....	190
Act of May 11, 1912.....	190
Ten years' summary.....	193
Special acts.....	193

Report of the Commissioner of Pensions—Continued.	Page.
Criminal and civil suits.....	194
Bounty-land warrants.....	195
Appeals.....	195
Length of Civil War service.....	196
Historical.....	197
Miscellaneous.....	197
Statistical tables relating to pensions.....	199
Report of the Commissioner of Patents.....	213
Work of the year.....	215
Employees and salaries.....	219
Collective trade-marks.....	220
Gains in efficiency and economy.....	221
The scientific library.....	221
Traveling-expense fund.....	222
Independent bureau desirable.....	222
Need for better quarters.....	224
Investigation by President's Commission on Economy and Efficiency.....	225
Statement of the Commissioner of Education.....	227
Division of higher education.....	229
Division of school administration.....	230
Division of school hygiene and sanitation.....	231
Division of rural education.....	233
Editorial division.....	234
Statistical division.....	237
Library division.....	237
Correspondence division.....	238
The Alaska school service.....	238
The Alaska reindeer service.....	241
Miscellaneous.....	242
Recommendations.....	243
Recommendations in regard to Alaska.....	244
Report of the Director of the United States Geological Survey.....	245
Special features.....	247
Need of a Survey building.....	247
General unfitness of buildings now occupied.....	247
Effects of crowded offices.....	248
Lack of fresh air and light.....	248
Rooms too hot for occupancy.....	249
The fire risk.....	250
Results of official inspection.....	251
Impairment of efficiency.....	251
Inconvenience due to lack of proper space.....	252
Dirt and noise from without.....	253
Distracting noises in the building.....	253
Increase of efficiency possible under better conditions.....	254
Present quarters of Survey unworthy.....	254
Status of legislation for new building.....	255
Progress of scientific work.....	255
Contributions of economic work to "pure science".....	255
Paleontologic work.....	257
Work on geologic folios.....	258
Work in land classification.....	258

Report of the Director of the United States Geological Survey—Continued.

Special features—Continued.

Progress of scientific work—Continued.

	Page.
Work on oil and gas.....	259
Theoretic work by Survey geologists.....	259
Educational work of the Survey.....	260
Land-classification policy.....	260
Work of the year.....	263
General increase.....	263
Publications.....	263
Field work by the Director.....	279
Changes in organization.....	279
Geologic branch.....	279
Administration.....	279
Publications.....	280
Division of geology.....	280
Organization.....	280
Allotments.....	281
Section of areal and structural geology.....	282
Work of chief of section.....	282
Work in New England States.....	284
Work in northern Appalachian region.....	285
Work in southern Appalachian region.....	286
Work in Central States east of the ninety-seventh meridian.....	286
Work in the public-land States.....	288
Subsection of geology of Atlantic and Gulf Coastal Plain..	290
Section of paleontology and stratigraphic geology.....	294
Section of economic geology of metalliferous ores.....	297
Section of economic geology of nonmetalliferous minerals.....	302
Section of economic geology of fuels.....	304
Work of chief of section.....	304
Classification of supposed coal and oil lands.....	305
Subsection of fuels east of the ninety-seventh meridian..	308
Work of committee on geologic names.....	311
Division of Alaskan mineral resources.....	312
Classes of work.....	312
Personnel.....	312
Field operations in season of 1911.....	313
Field operations for season of 1912.....	318
Office work.....	318
Geologic results.....	320
Division of mineral resources.....	320
Division of chemical and physical research.....	323
Land-classification board.....	324
Organization.....	324
Special features.....	326
Division of mineral classification.....	329
Coal.....	329
Oil.....	335
Phosphate.....	336
Metalliferous deposits.....	337

Report of the Director of the United States Geological Survey—Continued.

Work of the year—Continued.

Land-classification board—Continued.

	Page.
Division of hydrographic classification.....	338
Water power.....	338
Irrigation.....	340
Enlarged homesteads.....	341
Water reserves.....	342
Topographic branch.....	343
Organization.....	343
Personnel.....	343
Publications.....	343
Allotments.....	344
Cooperation.....	344
General office work.....	345
Summary of results.....	345
Atlantic division.....	347
Field work.....	347
Summary.....	347
Details of work by States.....	348
Office work.....	352
Central division.....	353
Field work.....	353
Summary.....	353
Details of work by States.....	354
Office work.....	361
Rocky Mountain division.....	363
Field work.....	363
Summary.....	363
Details of work by States.....	364
Office work.....	368
Pacific division.....	368
Field work.....	368
Summary.....	368
Details of work by States.....	370
Office work.....	375
Inspection of topographic surveying and mapping.....	377
Instruments and topographic records.....	377
Map of the United States.....	378
Water-resources branch.....	378
General scope of work.....	378
Allotments.....	378
Cooperation.....	379
States.....	379
Reclamation Service.....	382
Office of Indian Affairs.....	382
Forest Service.....	385
Publications.....	386
Division of surface waters.....	386
Organization.....	386
Gaging stations and cooperating parties.....	387
Publications.....	389
River-profile surveys.....	389
Division of ground waters.....	389

Report of the Director of the United States Geological Survey—Continued.

Work of the year—Continued.

Water-resources branch—Continued.

	Page.
Division of water utilization.....	392
Organization.....	392
Classification of public lands.....	393
Carey Act segregation lists.....	395
Acquisition of lands for national forests.....	396
Publication branch.....	397
Book-publication division.....	397
Section of texts.....	397
Section of illustrations.....	398
Section of map editing.....	398
Geologic maps.....	398
Topographic maps.....	399
Section of distribution.....	399
Division of engraving and printing.....	400
Maps, folios, and illustrations.....	400
Instrument shop.....	402
Photographic laboratory.....	402
Administrative branch.....	402
Executive division.....	402
Division of disbursements and accounts.....	404
Library.....	406

Report of the Director of the Bureau of Mines.....	407
Purpose of the Bureau of Mines.....	409
Some benefits from the work of the Bureau of Mines.....	410
Improvements in mine safety and in mining conditions.....	410
Mine-safety laws and regulations.....	413
Some benefits from fuel investigations.....	413
Where the bureau's work is done.....	415
Organization.....	415
Administrative division.....	415
Mining division.....	416
Mechanical division.....	416
Chemical division.....	417
Organization of the Pittsburgh station.....	417
Mine inspection in Alaska.....	417
Some features of the year's work.....	417
Mine-accidents investigations.....	417
Mine-rescue cars and stations.....	419
Mine-safety demonstration.....	420
Fuel investigations.....	420
Needs of the bureau.....	423
The need of buildings, grounds, and equipment.....	423
Need of extending mine-rescue and first-aid work.....	424
Need of extending accident investigations to other phases of mining industry.....	425
Need of extending investigations with a view to the prevention of mineral waste.....	426
Need of new equipment for fuel investigations.....	426
Need of extending investigations to the metal-mixing industries of the Western States.....	427

Report of the Director of the Bureau of Mines—Continued.

	Page.
Mining investigations.....	428
Special investigations of foreign mines.....	428
Investigation of mine disasters.....	429
Gas explosions.....	429
Coal-dust explosions.....	430
Accidents from improper handling or use of explosives.....	430
Accidents from electricity.....	431
Mine lighting and accidents.....	431
Need of better ventilation at the working face.....	432
Investigation of mine fires.....	432
Need of better escape arrangements.....	432
Need of refuge chambers.....	433
Falls of roof and coal.....	433
Personnel and procedure.....	434
Mine-safety work and investigations.....	436
Work at the mine-rescue stations.....	439
Investigations at the experimental mine.....	440
Inflammability of coal dust.....	442
Occurrence of mine gases.....	443
Chemical investigations of mine gases and of natural gas.....	444
Investigations of explosives used in mining.....	446
Physical tests of explosives.....	446
Chemical analyses of explosives.....	449
Special investigations of explosives.....	450
Electrical investigations.....	450
Physical investigations.....	451
Corrosion of iron and steel in mine equipment.....	452
Mine-equipment investigations.....	452
Accidents in metal mines.....	453
Fuel investigations.....	454
Inspection of government fuel purchases.....	454
Fuel-inspection laboratory.....	458
Fuel-efficiency investigations.....	458
Steaming tests.....	459
Gas-producer investigations.....	460
Briquetting investigations.....	461
Coking investigations.....	461
Lignite and peat investigations.....	462
Chemical investigations of the constitution of coal.....	463
Microscopic investigations of the constitution of coal.....	464
Deterioration and spontaneous heating of coal in storage.....	465
Petroleum technology.....	466
Field investigations.....	466
Laboratory investigations.....	467
Fuel-gas laboratory.....	468
Fuels chemical laboratory.....	468
Miscellaneous technologic investigations.....	472
Smelter-furnace problems.....	472
Reduction of iron ores with crude oil, and other furnace problems....	473
Investigation of metallurgical furnaces.....	474
Losses in the lead and zinc industry.....	474
Utilization of titaniferous iron ores.....	475
Tunnel methods.....	476

Report of the Director of the Bureau of Mines—Continued.	Page.
Mineral technology.....	476
Utilization of fuller's earth.....	477
Occupational diseases.....	477
Utilization of mica and feldspar.....	477
Treatment of slimes.....	477
Investigation of rare minerals, with especial reference to new sources and preparation of radium.....	478
Other investigations.....	478
Special mining industry reports.....	479
Examination of mining laws and regulations.....	480
Mine-accidents statistics.....	481
Administration.....	482
Financial statement.....	482
Correspondence and records.....	482
Personnel.....	483
Publications.....	484
Bulletins.....	484
Technical papers.....	488
Miners' circulars.....	490
Editorial work.....	490
Distribution of publications.....	491
Library.....	491
Computing, drafting, and photography.....	492
Report of the Government Hospital for the Insane.....	493
Officers of the hospital.....	494
Report of the superintendent.....	497
Movements of population.....	497
Administrative department—	
Office of the steward and disbursing agent.....	498
Ward service.....	503
Scientific department.....	510
Publications.....	512
Staff changes.....	514
Scientific meetings.....	515
Bulletin No. 4.....	515
Needs of the hospital.....	515
Statistical tables.....	519
Report of the Columbia Institution for the Deaf.....	531
Officers of the institution.....	532
Health.....	533
Changes in the corps of officers and teachers.....	533
Course of instruction.....	534
Lectures.....	534
Finances.....	535
Estimates for the fiscal year ending June 30, 1914.....	537
Survey of grounds.....	537
Inventory of property.....	537
Occupations of graduates.....	538
Meeting of oral teachers.....	538
International Congress of the Deaf.....	538
Exercises of presentation day.....	539
Conferring of degrees.....	539
Catalogue of students and pupils.....	540

Report of the Columbia Institution for the Deaf—Continued.	Page.
Regulations.....	541
Appendix—	
The acts of Congress relating to the Columbia Institution for the In-	
struction of the Deaf.....	543
Report of the Freedmen's Hospital	579
Roster of officers.....	581
Patients.....	583
Statistical summary.....	602
Financial statements.....	603
Needs.....	605
Training school for nurses.....	606
Report of the president of Howard University.....	613
Officers of the university.....	614
Registration.....	615
Teachers.....	616
The school of medicine.....	616
The school of law.....	617
The school of theology.....	617
The college of arts and sciences.....	618
The teachers' college.....	618
The academy.....	619
The school of manual arts.....	619
The commercial college.....	620
Courses in music.....	620
Needs.....	620
Resignation of president.....	620
Report of treasurer.....	620
Appendix: Financial report.....	621
Report of the Superintendent of the United States Capitol Building and Grounds	629
The Capitol.....	631
Capitol grounds.....	633
Engine house and Senate and House stables.....	633
Courthouse, Washington, D. C.....	633
United States Botanic Gardens.....	634
Expenditures.....	634
Report of the acting superintendent of the Yellowstone National Park.....	637
General statement.....	639
Travel.....	640
Roads.....	641
Fish.....	642
Wild animals.....	643
Antelope.....	643
Deer.....	644
Elk.....	644
Moose.....	645
Buffalo.....	645
Wild herd.....	645
Tame herd.....	646
Bear.....	646
Coyotes.....	647
Mountain sheep.....	647
Beaver.....	647
Other animals.....	647
Protection of game.....	647

Report of the acting superintendent of the Yellowstone National Park—Con.	Page.
Trails.....	648
Forest fires.....	648
Telephone lines.....	648
Sanitation.....	648
Improvements under the War Department.....	649
Recommendations.....	649
Appendix:	
Rules and regulations of May 27, 1911.....	650
Instructions of June 6, 1911.....	651
Concessions.....	653
Agreement with Departments of Agriculture and War relative to protection of forests from fire.....	655
Report of the acting superintendent of the Yosemite National Park.....	657
General statement.....	659
Grazing.....	660
Fires.....	660
Game.....	660
Fish.....	660
Fences.....	660
Patented lands.....	660
Telephone service.....	661
Roads.....	661
Government roads.....	662
Trails.....	662
Bridges.....	662
Concessions.....	663
Hotels and camps.....	663
San Francisco water supply.....	663
Buildings.....	665
Power plant.....	665
Water supply.....	665
Sanitation.....	665
Deaths.....	665
Camp Yosemite.....	665
Visitors.....	666
Estimates.....	667
Recommendations.....	668
Thanks.....	668
Report of resident engineer.....	669
Rules and regulations of March 30, 1912.....	670
Instructions to be observed by all persons in the park.....	672
Penalty for injuring trees and for not extinguishing fires.....	674
Report of the acting superintendent of the Sequoia and General Grant National Parks.....	675
General conditions.....	677
Tourists, travel, and accommodations.....	677
Concessions.....	678
Permits.....	678
Improvement work.....	678
Game.....	679
Recommendations.....	679
Protection of game.....	681
Telephone lines.....	681
Fish hatchery.....	681

Report of the acting superintendent of the Sequoia and General Grant National Parks—Continued.

Recommendations—Continued.

	Page,
Buffalo.....	681
Development of caves.....	681
The Sherman tree.....	681
The General Grant Park.....	681
Rules and regulations.....	683
Sequoia National Park.....	683
General regulations of March 30, 1912.....	683
Instructions of March 30, 1912.....	684
Regulations of March 30, 1912, governing the impounding and disposition of loose live stock found in the Sequoia and General Grant National Parks.....	686
General Grant National Park.....	687
General regulations of March 30, 1912.....	687
Instructions of March 30, 1912.....	687
Regulations of March 30, 1912, governing the admission of automobiles and motor cycles into the General Grant National Park...	689
Report of the superintendent of the Mount Rainier National Park.....	691
Topography.....	693
Forest conditions.....	694
Roads and trails.....	694
Ranger cabins.....	695
Mining claims.....	696
Travel.....	696
Guides.....	696
Fires.....	697
Patrol.....	697
Game.....	697
Mineral springs.....	697
Automobiles.....	697
Hotels and camps.....	698
Special permits.....	698
Estimates and recommendations.....	699
Rules and regulations:	
General regulations of March 30, 1912.....	700
Instructions of March 30, 1912.....	701
Regulations of March 30, 1912, governing the impounding and disposition of loose live stock.....	703
Regulations of March 30, 1912, governing the admission of automobiles and motor cycles.....	704
Excerpt from an act to provide for determining the heirs of deceased Indians; for the disposition and sale of allotments of deceased Indians; for the leasing of allotments, and providing punishment for depredations and for not extinguishing fires on public lands, etc.	705
Report of the superintendent of the Mesa Verde National Park.....	707
General statement.....	709
Character of the country.....	709
Custodianship.....	709
Order.....	709
Stock and sheep.....	710
Roads and trails.....	710

Report of the superintendent of the Mesa Verde National Park—Continued.	Page.
Water supply.....	710
Buildings.....	710
Game.....	711
Travel.....	711
Repairs.....	711
Lands.....	711
Developments.....	711
Recommendations.....	712
Appendix:	
Act creating park.....	713
Rules and regulations.....	714
Regulations governing disposition of loose live stock.....	717
Punishment for depredations and for not extinguishing fires on public lands, etc.....	718
Excerpt from deficiency appropriation act approved June 25, 1910...	718
Excerpt from act of August 24, 1912, making appropriation for Mesa Verde Park for fiscal year 1913.....	718
Report of the superintendent of the Crater Lake National Park.....	719
General statement.....	721
Visitors.....	723
Concessions.....	723
Automobiles.....	723
Loose stock driven through the park.....	724
Forest fires.....	724
Roads and trails.....	724
Bridges.....	726
Buildings and fences.....	726
Water power and electric plant.....	727
Park rangers, ranger stations, and telephone lines.....	727
Patented lands.....	727
Game and game preserve.....	727
Fish and fishing.....	728
Predatory animals.....	729
Accidents.....	729
Observance of rules and regulations.....	729
Rules and regulations:	
General regulations of March 30, 1912.....	730
Regulations of March 30, 1912, governing the impounding and disposition of loose live stock.....	733
Regulations of March 30, 1912, governing the admission of automobiles and motor cycles.....	733
Report of the acting superintendent of the Glacier National Park.....	735
General statement.....	737
Transportation and accommodations.....	738
Administration.....	739
Number of visitors.....	740
Fires.....	741
Accidents.....	742
Live stock.....	742
Game.....	742
Concessions.....	743
Recommendations.....	745

Report of the acting superintendent of the Glacier National Park—Continued.	Page.
Appendix.....	747
Act establishing Glacier National Park.....	747
Act of Montana legislature ceding jurisdiction.....	748
A bill (H. R. 1679) pending before Congress to accept the cession by the State of Montana of exclusive jurisdiction over the land embraced within the Glacier National Park, and for other purposes...	749
General regulations of March 30, 1912.....	752
Regulations of March 30, 1912, governing the impounding and disposition of loose live stock.....	753
Regulations of March 30, 1912, governing the admission of automobiles and motor cycles.....	754
Report on Platt and Wind Cave National parks, Sullys Hill Park, Casa Grande Ruin, Muir Woods, Petrified Forest, and other National monuments, including list of bird preserves.	757
Platt National Park.....	759
Regulations of June 10, 1908.....	760
Wind Cave National Park.....	762
General Regulations of March 30, 1912.....	763
Regulations of March 30, 1912, governing the impounding and disposition of loose live stock.....	765
Sullys Hill Park.....	766
Casa Grande Ruin.....	767
National monuments and preservation of American antiquities.....	769
General statement.....	769
Muir Woods National Monument.....	771
Petrified Forest of Arizona.....	774
Navajo National Monument.....	775
Chaco Canyon National Monument.....	777
Rainbow Bridge National Monument.....	779
El Morro National Monument.....	779
Lewis and Clark Cavern National Monument.....	780
Tumacacori.....	783
Montezuma Castle National Monument.....	783
Natural Bridges National Monument.....	784
Gran Quivira National Monument.....	785
Mukuntuweap National Monument.....	787
Shoshone Cavern National Monument.....	788
Sitka National Monument.....	789
Devils Tower National Monument.....	789
Pinnacles National Monument.....	790
Colorado National Monument.....	791
Cinder Cone National Monument.....	792
Lassen Peak National Monument.....	793
Gila Cliff-Dwellings National Monument.....	793
Tonto National Monument.....	794
Grand Canyon National Monument.....	794
Jewel Cave National Monument.....	796
Wheeler National Monument.....	797
Mount Olympus National Monument.....	798
Oregon Caves National Monument.....	799
Devils Postpile National Monument.....	802
Bird Reserves.....	802

	Page.
Report of the superintendent of the Hot Springs Reservation.....	805
Introduction.....	807
Visitors.....	808
Bathhouses.....	808
Drumming.....	811
Improvements.....	812
Whittington Lake Park.....	813
Government bathhouse.....	813
Receipts and disbursements.....	815
Official visits.....	816
Recommendations.....	816
Employees.....	817
City of Hot Springs.....	818
Appendix:	
Rules and regulations for government of bathhouses receiving hot water under lease from Government.....	820
Report of the medical director of the Hot Springs Reservation.....	827
General statement.....	829
Federal registration board.....	831
Improvement in the bathhouses.....	833
The service of the bathhouses.....	833
Government free bathhouse.....	835
Bath attendants.....	836
Physiological effects of the water of the hot springs.....	837
Appendix:	
Report to Congress on physiological and therapeutical effects of the waters of the hot springs.....	837
Rules and regulations, with all amendments thereto up to and includ- ing June 30, 1912, for the government of all bathhouses receiving hot water from the United States Reservation at Hot Springs, Ark..	885
Form used by physicians for bathing directions.....	889
Form used by bathhouses for directions for special hydrotherapeutics..	890
Bath permit issued to persons not employing physician.....	890
Rules approved by the Department for the government of the Federal Registration Board of the United States Reservation, Hot Springs, Ark., with amendments up to July 25, 1912.....	891
Physician's application for registration.....	892
Rules for bath attendants in the pay bathhouses receiving hot water from the springs on the Hot Springs Reservation.....	893
Certificate required of all bath attendants.....	894
License issued to bath attendants.....	894
Application for baths at the government free bathhouse.....	895
Regulations of July 7, 1900, for the government of the free bathhouse.	895
Rates at pay bathhouses.....	896

ILLUSTRATIONS.

	Page.
Map of the United States showing areas covered by geologic surveys.....	280
Map of the United States showing areas covered by topographic surveys.....	346
Map of the Yellowstone National Park.....	656
Map of the Yosemite National Park.....	674
Map showing routes to Crater Lake.....	722
Map of the Crater Lake National Park.....	725
Map of the Glacier National Park.....	756
Map of Wind Cave National Park.....	762
Map of a portion of Hot Springs.....	826
Women's dressing room in one of the new bathhouses. Side of men's bath hall in one of the new bathhouses showing bath stalls, Hot Springs.....	834
Dressing stall in one of the new bathhouses. Aisle between bath stalls in one of the new bathhouses, Hot Springs.....	834
Cooling room in one of the new bathhouses. Interior of men's bath hall in one of the new bathhouses showing hot-pack couches, hot-air cabinets, and registers for pedestal distribution of heat and air, Hot Springs	834
Fig. 1. Sullys Hill Park, North Dakota.....	766
2. Casa Grande Ruin Reservation, Arizona.....	768
3. Muir Woods National Monument, California.....	772
4. Petrified Forest National Monument, Arizona.....	775
5. Navajo National Monument, Arizona	776
6. Navajo National Monument, Arizona (as amended by proclamation Mar. 14, 1912).....	777
7. Chaco Canyon National Monument, New Mexico.....	778
8. Rainbow Bridge National Monument, Utah.....	778
9. El Morro National Monument, New Mexico.....	780
10. Lewis and Clark Cavern National Monument, Montana.....	781
11. Tumacacori National Monument, Arizona.....	782
12. Montezuma Castle National Monument, Arizona.....	783
13. Natural Bridges National Monument, Utah.....	784
14. Gran Quivira National Monument, New Mexico.....	785
15. Mukuntuweap National Monument, Utah.....	786
16. Shoshone Cavern National Monument, Wyoming.....	787
17. Sitka National Monument, Alaska.....	788
18. Devils Tower National Monument, Wyoming.....	789
19. Pinnacles National Monument, California.....	790
20. Colorado National Monument, Colorado.....	791
21. Cinder Cone National Monument, California.....	792
22. Lassen Peak National Monument, California.....	792
23. Gila Cliff Dwellings National Monument, New Mexico.....	793
24. Tonto National Monument, Arizona.....	794
25. Grand Canyon National Monument, Arizona.....	795
26. Jewel Cave National Monument, South Dakota.....	796
27. Wheeler National Monument, Colorado.....	797
28. Mount Olympus National Monument, Washington.....	799
29. Oregon Caves National Monument, Oregon.....	800
30. Devils Postpile National Monument, California.....	801

REPORT OF THE SECRETARY OF THE INTERIOR.

64213°—INT 1912—VOL 1—1

1

BUREAUS OF THE INTERIOR DEPARTMENT.

The Department of the Interior was established by the act of March 3, 1849 (9 Stat. L., 395).

GENERAL LAND OFFICE.

Organized as a bureau of the Treasury Department under act of April 25, 1812 (2 Stat. L., 716).

First Commissioner, Edward Tiffin, of Ohio; appointed May 7, 1812.

Became a bureau of the Interior Department when that Department was organized under the act of March 3, 1849 (9 Stat. L., 395).

INDIAN OFFICE.

Organized as a bureau of the War Department under act of July 9, 1832 (4 Stat. L., 564).

First Commissioner, Elbert Herring, of New York; appointed July 10, 1832.

Became a bureau of the Interior Department when that Department was organized.

BUREAU OF PENSIONS.

Organized as a bureau of the War Department under act of March 2, 1833 (4 Stat. L., 622).

First Commissioner, James L. Edwards, of Virginia; appointed March 3, 1833.

Became a bureau of the Interior Department when that Department was organized.

PATENT OFFICE.

Organized as a bureau of the State Department under act of March 4, 1836 (5 Stat. L., 117).

First Commissioner, Henry S. Ellsworth, of Connecticut; appointed July 4, 1836.

Became a bureau of the Interior Department when that Department was organized.

BUREAU OF EDUCATION.

Organized under act of March 2, 1867 (14 Stat. L., 434).

Became a bureau of the Interior Department July 1, 1869, under act of July 20, 1868 (15 Stat. L., 106).

First Commissioner, Henry Barnard, of Connecticut; appointed March 14, 1867.

GEOLOGICAL SURVEY.

Organized as a bureau of the Interior Department under act of March 3, 1879 (20 Stat. L., 394).

First Director, Clarence King, of New York; appointed April 14, 1879.

RECLAMATION SERVICE.

Organized under act of June 17, 1902 (32 Stat. L., 388), under the Director of Geological Survey, Charles D. Walcott.

First Director, F. H. Newell, of Pennsylvania; appointed March 9, 1907.

BUREAU OF MINES.

Organized as a part of the Interior Department under the act of May 16, 1910 (36 Stat. L., 369).

First Director, Joseph A. Holmes, of North Carolina; appointed September 3, 1910.

ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR

DECEMBER 2, 1912.

SIR: My last annual report contained a number of suggestions and recommendations of changes in legislation and in administrative methods affecting the Department of the Interior. I am pleased to be able to report that substantial progress has been made in both of these directions. I regret that, largely through failure of appropriate legislation, it has not been possible to accomplish more.

GENERAL REVIEW AND RECOMMENDATIONS.

In view of the existing political and legislative conditions, it did not seem desirable during the past year to press further the suggestions made in my last annual report with regard to comprehensive departmental reorganization. At the request of chairmen of committees of Congress and of other members most of the other suggestions and recommendations in my previous report were embodied in definite bills drafted in the Department and afterward introduced either in the Senate or House of Representatives, and some of the most important measures have now been enacted into law.

Some conception of the legislative work affecting the Department of the Interior may be formed from considering the fact that more than one thousand reports on pending bills have been made up to this time by the Department to the present Congress. While some of these reports were formal, many of them were of great importance and difficulty and many of the bills were considered at committee hearings attended personally by the Secretary or other representatives of this Department.

A COMPREHENSIVE CLASSIFICATION POLICY FOR THE PUBLIC DOMAIN.

My previous report pointed out that the chief function of the Department of the Interior has been, generally speaking, the administration and disposition of the lands and natural resources held directly or in trust by the Nation. It called attention to the lack of adequate laws for the proper administration and disposition of these lands and natural resources, especially as they are embraced within the public domain. Its principal recommendation was that all of our public lands should be classified according to their respective

characteristics and appropriate uses, and that they should then be administered or disposed of in accordance with their real characteristics under the classification. This suggestion of comprehensive land classification and of administration based upon such classification met with much approval upon the part of individual Members of Congress and others, but the subject was given no serious consideration at the last session, and I earnestly renew my recommendation with respect to it. The existing statutes attempt to recognize in a very general and ineffective way the fundamental differences between the different classes of agricultural land still remaining in the public domain. Nevertheless, land adapted to dry farming, land adapted to ordinary cultivation without irrigation, and land requiring irrigation each presents differences in method of cultivation and admits of appropriate differences in the rules with regard to residence, which the present system is not flexible enough adequately to recognize. Greater difficulties, however, are found in the present laws or lack of laws with regard to other parts of the public domain, especially our timber lands, our grazing lands, our water-power and reservoir sites, and our lands containing coal, oil, gas, asphalt, potash, nitrates, and phosphate.

There is quite general misapprehension as to the scope and effect of the act under which these important classes of lands and their resources are now withdrawn from entry under the ordinary homestead or mining laws. The Withdrawal Act, as amended at the last session of Congress in accordance with the recommendations of this Department, furnishes adequate authority for the withdrawal of such lands and resources "for water-power sites, irrigation, classification of lands, or other public purposes." The difficulty is that once withdrawn and classified such lands can not be restored to entry under laws which will promote development, prevent mere exploitation, and protect the public interest. Partial exceptions to this general statement exist with respect to coal lands, which can be classified and, after a valuation has been placed upon them by the Geological Survey, are made subject to public entry upon payment of the valuation. Water-power sites can be developed under revocable permits. Lands suitable for reservoir sites and for irrigation can be withdrawn for the use of irrigation projects under the Reclamation laws or the Carey Act. Useful as are these methods of development after withdrawal, they do not adequately cover the field or permit appropriate development even of these particular kinds of lands, and the remaining classes of lands above noted are practically without any statutory provision for their appropriate development and use. Oil, gas, asphalt, potash, nitrate, and phosphate lands once withdrawn must remain locked up unless opened to exploitation under the general mining laws applicable to and intended for metalliferous minerals or placer deposits. My previous report pointed out that "it is the conviction that

exploitation under the guise of development has not been effectively prevented, which has led to the great public movement for the conservation of our national resources," and that "if we can frankly adopt and put into force laws which will absolutely prevent mere exploitation, we can far more safely enact liberal laws and regulations to encourage legitimate development." To this end specific recommendations were made for laws which should be adopted even if Congress were not prepared to authorize a comprehensive classification policy. The chief of these recommendations were probably the adoption of constructive legislation with respect to water-power development and control and the comprehensive application of the leasing system to the development of our public coal, oil, gas, asphalt, nitrate, potash, and phosphate lands, with appropriate provision for the protection of prospectors during a reasonable exploration period preliminary to the leasing of the land. It was pointed out that the enlarged application of the leasing principle to the public domain generally would more effectively promote development and protect the public interest than the present system, especially as applied to lands of the classes just mentioned. It was earnestly recommended that laws should be enacted which would permit the Government to sell the mature timber upon the public domain and thereafter to open to homestead entry such portions of the land as are available for agricultural uses, retaining and reforestation in Government hands the land upon which timber can be raised, but which is not adapted for future agricultural uses. Vast tracts of this latter sort are now being purchased in the Appalachian Mountains by the National Forest Reservation Commission to protect navigable streams and prevent disastrous soil erosion. It is inexcusable to permit public lands of this character to be acquired now by private interests, when we are spending public moneys to buy just such lands elsewhere, and may have to repurchase in the future the very lands from which the Government is now parting. If statutes are enacted to provide for such classification and disposition of timber, it is evident that the Timber and Stone Act will be superseded and should be repealed, as should also be repealed the act of June 3, 1878, authorizing the cutting of timber on mineral lands, and the act of March 3, 1891, whereby provision is made for the issuance by this Department of permits for the cutting of timber on nonmineral lands. The adoption of a grazing lease law for the public range was also urged for the protection of the range itself from impending destruction and for the protection of the legitimate interests of both the sheep and the cattle owners.

While these general recommendations have not been adopted and the country must still wait for a comprehensive classification policy for the public domain, some progress has in fact been made in this general direction.

HOMESTEAD LAWS.

One of the most important recommendations made in my previous report was the amendment of the homestead law so as to reduce the period required for actual residence, provided the reduction was accompanied by definite requirements as to the actual and progressive cultivation and improvement of the ground. The specific recommendation was that the homestead settler should be excused from the necessity of residing upon his land during the first two years after entry, provided he substituted for residence during that period the improvement and cultivation of a substantial portion of the ground, to be followed by actual residence and progressive cultivation during the remaining three years of the established five-year homestead period. I am still of the opinion that this recommendation, based as it was upon personal examination of conditions in certain portions of the public-land States, and upon conferences and correspondence with actual settlers, would have better met many of the existing conditions than the statute which was in fact adopted. Nevertheless, Congress preferred to reduce the homestead period to three years and to excuse the settler from residence during not more than five months of each of these years; and as a result of the interchange of views between the congressional committees and the Department the act as passed (June 6, 1912) was made to conform to the important fundamental principles discussed in my previous report. It met the approval of this Department and was signed by you. It established the general rule requiring definite and progressive cultivation, and at the same time it gives to the Secretary of the Interior the power to reduce these requirements where the character and condition of the land justify such action. The Department is thus enabled to make the laws and the administrative regulations more nearly fit actual conditions as they exist, so that these regulations may be just as strict in the prevention of nonresident exploitation as they are liberal in the encouragement of the bona fide settler. The law is being administered in this spirit and for this purpose and should prove of great benefit in the further development of the public-land States.

General legislation permitting the disposition under the agricultural-land laws of the surface of lands believed to contain deposits of oil and gas was not enacted as recommended, but a statute permitting such entries upon public lands in Utah was passed. The serious defect in the Withdrawal Act of June 25, 1910, which was pointed out in the last annual report of this Department, has been cured by the adoption of the amendment there recommended, so that lands withdrawn for important public purposes like water-power sites or storage reservoirs can no longer be entered under the mining laws of the United States, except so far as these laws apply to metal-

liferous minerals. Potash and nitrate withdrawals are also thus protected.

The homestead commutation law has not been repealed, and no limitation has been fixed within which such scrip as military bounty, soldiers' additional homesteads, etc., may be located and lands acquired thereunder. This should be done.

RECLAMATION ENTRIES.

Among my recommendations of legislation affecting the Reclamation Service were: That title should pass to the settler in advance of full payment of his share of the construction cost, with reservation of a lien to secure ultimate full payment; and that the duty of collecting such payments should be transferred from the General Land Office to the Reclamation Service. Both changes were effected by the act of August 9, 1912 (37 Stat., 265), providing for patents on reclamation entries. This statute embodied, with slight modifications, parts of a bill to amend the reclamation law which was drafted in the Department and introduced in both Houses (S. 6272 and H. R. 20490). Under it a homestead settler, who has performed the duty of residence (3 years), reclamation and cultivation (half the area of his entry), and has paid all sums then due the United States on account of his land or water right, may have a patent forthwith, whereas hitherto he would have had to wait until he had also paid all the 10 annual installments of the building charge. Under the new statute he gets a marketable title quickly, and the unpaid balance of his share of the cost of the works becomes a first lien on his land. He can therefore mortgage it, subject to the Government's lien, and thus obtain the capital necessary to develop it. The private land owner who buys a water right from the Reclamation Service is put upon exactly the same footing as the homestead entryman with respect to marketable title, reclamation, and cultivation. The lien of the Government is enforceable by sale, and 8 per cent per annum is chargeable upon all sums in default. Dues for operation and maintenance charges are expressly covered by the security of the Government's lien. Pending full payment of the building charges the holdings of water-right purchasers for private lands and of entrymen and patentees of public lands are restricted to one farm unit, with provision for the forfeiture of any excess. Desert-land entries embraced within reclamation projects and securing water from the project works are placed on a like footing by a clause in the deficiency appropriation act of August 26, 1912 (37 Stat., 610). The act of July 24, 1912 (37 Stat., 200), authorizing the partial assignment of desert-land entries in reclamation projects and requiring such assignments to conform to

farm units established by the Department on the application of the entryman, still further harmonizes the status of homestead entrymen and desert-land entrymen within reclamation projects. The fourth section of the said act of August 9, 1912, authorizes the designation of bonded fiscal agents or officers of the Reclamation Service to collect the water charges hitherto payable to the receivers of the local land offices, which are often not sufficiently near or in touch with the reclamation projects to make effective cooperation with the project officials possible. Much administrative improvement will certainly result from the adoption of these recommendations by Congress.

COAL-LAND LEASES.

As already noted, it has thus far been impossible to secure serious attention in Congress for the passage of a comprehensive leasing law for coal, oil, and the other minerals heretofore mentioned. Much encouragement, however, is to be found in the favorable consideration by the Senate Committee on Public Lands of the bill for the leasing of coal lands in the Territory of Alaska, which was in part the result of conferences between representatives of the American Mining Congress and the Department of the Interior. This bill was favorably reported to the Senate, but too late in the session to secure the consideration necessary for its passage. It is earnestly to be hoped that a bill of this character will be enacted at the present session of Congress. Meanwhile, however, the passage of Private Resolution No. 4 has enabled the Department of the Interior to make a practical application of the leasing system to coal lands in the State of Wyoming. The facts are as follows:

In May, 1909, indictments were returned in the United States court for the district of Wyoming charging certain persons with conspiracy to defraud the United States by the attempted unlawful acquisition of coal lands in the Lander, Wyoming, district, amounting to 9,500 acres, included in 32 coal cash entries. Most of the persons indicted were residents of the State of New York. The Owl Creek Coal Company was one of the corporations connected with the transaction.

The General Land Office directed proceedings against the entries with a view to the cancellation thereof. The local land office at Lander, by a decision rendered in June, 1910, held these entries for cancellation. This decision was, on appeal, affirmed by the Commissioner of the General Land Office on February 13, 1911. On appeal to the Department this decision was affirmed, and all of these entries have now been canceled.

While the cancellation proceedings were pending two bills were filed in the United States court in Wyoming praying an injunction

to restrain the mining of coal upon the lands involved in the litigation pending the determination thereof. The Government was successful in both of these suits, but upon stipulation the court allowed the defendants to continue their mining operations upon the payment of a royalty of 6½ cents per ton on all coal mined.

By Private Resolution No. 4, approved August 1, 1912, the Secretary of the Interior was authorized by Congress to allow the Owl Creek Coal Company to continue the operation of the mine or mines upon any of the lands embraced in these entries upon such conditions and under such rules and regulations as he might prescribe. The conditions, rules, and regulations thus authorized were prescribed in the form of a lease, which was executed for and on behalf of the United States and the Owl Creek Coal Company on the 29th day of August, 1912. Its principal provisions are as follows:

Term.—The lease is made for a period of 10 years from date of execution (Aug. 29, 1912), and gives the lessee a preferential right of renewal for successive five-year periods up to a total of 30 years from date of execution.

Estate.—The lessee is given the right and privilege of mining and extracting the coal and of disposing of the same, subject to the terms of the lease.

Acreage.—The tract embraced in the lease comprises 2,480 acres of the 9,500 acres involved.

Rental.—The lessee is to pay rent at the rate of \$1 an acre, or \$2,480 annually, in advance, payable on the 1st of July of each year. This rental is to be credited upon royalties due under the lease for coal mined during the year, for which rent is so paid in advance, or, in the discretion of the Secretary, upon royalties due for succeeding years.

Royalty.—The lessee is to pay a royalty on each ton of 2,000 pounds run of mine, as follows: Six and one-half cents per ton for the first five years, 8 cents per ton for the second five years. The royalty payable thereafter is to be fixed at the beginning of each subsequent five-year period for which the lease is renewable. The lease provides that the royalties due shall be payable in three installments, as follows: On or before February 1, for all coal mined during the months of October, November, and December; on or before May 1, for all coal mined during the months of January, February, and March; on or before November 1, for all coal mined during the months of April, May, June, July, August, and September.

Operating conditions.—The lessee agrees to conduct all mining operations in accordance with the regulations of the Secretary of the Interior, and subject to the examination and inspection of the Federal Bureau of Mines, and to comply with all directions of that bureau for the prevention of unnecessary waste of the coal, the safeguarding of the lives of miners and employees, and the efficient operation of the mine.

Removal of property.—The lessee is given the right to place upon the property certain necessary personal property for use in the operation of the mine, such as buildings, structures, and machinery, and the further right to remove, upon the expiration or forfeiture of the lease, all such property belonging to it, except buildings, structures, and mine timbers and supports in place, provided that in the removal no injury is done to the realty or the mine, so that it can again be equipped for mining operations.

Assignment of the lease or any interest therein is prohibited.

The lessee is given the right to use the surface of the leased land for necessary purposes in connection with the conduct of mining operations.

Forfeiture provisions.—The Secretary of the Interior has the right to forfeit the lease upon the lessee's failure to comply with its terms and conditions, including the nonpayment of rents and royalties when due, after giving proper and reasonable notice. Forfeiture shall not be enforced because of cessation of work caused by strikes, loss of buildings or machinery through fire or unavoidable accidents; but the happening of any such event is not to excuse the payment of rents or royalties due or prevent a forfeiture for a failure to pay the same.

MINING LAWS.

✓ The thorough revision of our mining laws which was recommended was seriously discussed, but definite action has not been taken. Meanwhile, however, the recommendation that the use of the power of attorney for making mining locations should be curtailed and safeguarded has been carried out by the passage of a statute limiting the number of placer-mining claims which may be located in Alaska by power of attorney, fixing the maximum area of such claims hereafter located by associations at 40 acres, and requiring a minimum of \$100 worth of labor to be done upon every placer-mining claim in said Territory annually until a patent has been issued therefor (act of Aug. 1, 1912; 37 Stat., 242). Action has not been taken with regard to the recording of notices of mining locations and requiring mineral locators to come forward with their applications for patent within a specified time; nor has action been taken to abolish the law of the apex without prejudice to existing rights. These matters should receive prompt consideration even if a comprehensive revision of our mining laws is not now undertaken.

It is becoming increasingly evident that the lode-mining law needs changes in one respect, at least. The law at present does not provide for the creation of any rights in supposedly mineral land, except by the issuance of patents, and in that regard Congress has provided that a patent can follow only on a legal location and has said "but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located." As long as Congress desires to adhere to the policy at present embodied in statute law of disposing of mineral land absolutely, the law quoted above tends fairly well to the development of mineral properties where the ore can be discovered at or near the surface of the ground, but it seems to be ill calculated for a district where, as is the case notably in some of the copper-mining districts, the ore lies at depths of hundreds and sometimes thousands of feet. The expense of actual discovery of the vein or lode within the limits of any particular claim in such cases involves deep exploration, either by drilling or by the sinking of a shaft from the surface, or the extension of a tunnel into the claim. Either of these operations may involve great expense, and it has been repeatedly urged on the Department that

investors are reluctant to spend the money required without further assurance than the law as it reads at present can give them. On this ground the Department has been strenuously pressed to so construe the law as not to require an actual discovery of the lode which is supposed to exist within each claim, but to patent the claims upon evidence of the existence of mineral at or near the surface wholly disconnected with the supposed lodes below and of no value in itself either present or prospective, it having been further urged that in these cases it was a matter of geological inference that ore bodies did exist far below the surface. It is obviously the duty of the Department to carry into effect the intention of Congress expressed in statutory form. Congress having said that no lode claim should be patented without discovery of the vein or lode, within the limits of the claim, it would be an evident usurpation of power for this Department to patent lode-mining claims without proof of actual discovery. The frequently repeated assertions that the recent rulings of the Department have overturned interpretations placed upon the law for thirty years seem utterly without foundation, as is pointed out in the recent departmental decisions. On the contrary, had the Department decided that it could dispense with actual discovery it would have overturned the practically unanimous holdings both of courts and of the Department ever since the enactment of the lode-mining law. Doubtless in some cases claims have been patented where there was little or no proof of actual discovery, but the patenting of such claims is evidently to be laid to a misapprehension of the facts by employees of the Land Office, and not to a misconstruction of law by the Department.

It seems, however, possible by a change in the law to keep in force the policy of the Government expressed in the mining law of rewarding the actual discoverer of valuable veins, while at the same time giving such protection during the work preliminary to actual discovery as would make it possible for capital to invest, taking no more risk than that inherent in the question whether there is or is not in fact valuable mineral in the place where it is sought. I suggest that the law should be amended so as to give a prospector, for a term of years, an exclusive right of possession and of prospecting within a limited area of land. In case actual discovery were made within the time given, patent would issue. The prospector should be obliged to perform a reasonable amount of work during the existence of the permit in order to make evident his good faith in attempting to find mineral within the limits of the claim. He should, however, be given the right, by proper proceedings, to settle disputed questions of intervening claims, both in case of conflict with other mineral claims and also cases of conflict with agricultural claimants, so that he might at the earliest possible moment know whether or not his title would be absolutely clear upon his making discovery.

The only alternative suggested to this plan, apart from the evidently impossible one of accepting as evidence of discovery something which is clearly not such evidence, would be for Congress to amend the law so as to permit the issuance of patents to mining claims upon proof of the existence of valuable mineral within the claims by geological inference. The objections to this are many. In the first place, it is evident that no geological inference can be absolutely sure. This is particularly clear in the case of copper deposits at great depth, for it was admitted in oral argument before the Department in a case where a large number of claims were applied for, that it was impossible for the claimants to state that there was in fact any copper ore at all under the surface of any particular claim; all that they asserted that they could be sure of was that somewhere beneath the surface of the large number of claims there was a large amount of such ore. Another objection of perhaps much greater weight is that to substitute geological inference for the actual discovery of the vein or lode as required by the present law is to give to the geologist, or the man financially able to employ skillful geologists the reward which it has been the policy of the law up to now to extend to the prospector or actual discoverer. It would also follow that a wealthy man could, without any actual development of the mineral resources of the country, obtain patents for and thus monopolize large districts of valuable mineral land.

TRANSPORTATION AND COAL DEVELOPMENT IN ALASKA.

As pointed out in my previous report, the whole development of Alaska is waiting largely upon the passage of suitable legislation for the development of its transportation facilities and of its coal lands. I have heretofore urged as vigorously as was in my power the immediate relief of Alaska in the following particulars:

First. The construction by the Federal Government of a central trunk line railroad from tidewater through the Matanuska coal fields to the Tanana or Yukon Rivers.

Second. The passage of a liberal but carefully guarded leasing law for the development of its mineral resources and especially its coal lands.

Third. The reservation of a sufficient amount of these coal lands to provide for future needs of the Navy and the mining of this coal by the Government for this purpose.

Fourth. More liberal appropriations for aids to navigation, such as lights and buoys.

Fifth. More liberal appropriations for the construction of roads and trails.

Sixth. The adoption of a form of Territorial government better adapted to its remote situation and peculiar local conditions.

The sixth and last of these recommendations is the only one which Congress has actually put into effect. A Territorial legislature with limited jurisdiction has been created for the Territory and will undoubtedly give its attention to many measures of local relief, for which bills were drafted in this Department and urged upon the last session of Congress, but were not passed. These bills related to such matters as the protection of the public health, the registration of marriages, births, and deaths; the supervision of banks; and other similar subjects. The appropriations for the improvement of navigation and for the construction of roads and trails were not increased by Congress as they should have been. On the other hand, substantial progress has been made in the consideration of the needs of the Territory for the construction of railroads and for the mining by the Government of coal for the use of the Navy. A Government railroad has not been authorized, but a provision was inserted in the Territorial government bill authorizing the appointment of a commission consisting of an Army engineer, a Navy engineer, a representative of the Geological Survey, and a civil engineer who has had practical experience in the construction and operation of railroads, but who has not been connected with any of the roads in Alaska. This commission was promptly appointed and proceeded to Alaska, where it has remained as long as the season would permit, engaged in a personal examination of the Territory with a view to making to the present session of Congress as comprehensive a report as possible within the available time. Following my annual report and after a personal visit to Panama, I presented before the appropriate committees of Congress the suggestion that much valuable railroad material and equipment was being released from further use in the construction of the Panama Canal and would be available for utilization in Alaska. The suggestion is supported by officials at Panama and by many others and seems worthy of careful consideration by Congress at the earliest possible date, so that this material and equipment shall not be sacrificed at forced sale when it would have a far greater value for use in Alaska.

The Navy Department is pressing for prompt consideration its urgent need of adequate coal reserves on the Pacific coast and especially in Alaska. It secured from the last Congress an appropriation of \$75,000 for mining and testing Alaska coal. This work was undertaken by the Department of the Interior through the agency of the Bureau of Mines. It was hoped that some investigation of the Matanuska coal fields for this purpose would be possible, but the season was so far advanced when the appropriation became available that work was necessarily confined to the Bering field, where a coal mine has been opened and coal for experimental use by the Navy under practical working conditions is being mined and transported to tide

water. This work will furnish a practical test not only of the coal itself, but of the conditions under which Alaskan coal must actually be mined and made available for use. The Alaska coal-leasing bill, which was favorably reported by the Senate Committee on Public Lands, has the support of a part, at least, of the entrymen whose claims are still in controversy with the Government. It proposes to give all of the entrymen interested in still pending entries, who are not involved in pending criminal proceedings or have not been found guilty of criminal acts in connection with their claims, a preference right to lease the lands in which they are respectively interested. During the year progress has been made in the disposition of these claims. The Cunningham claims and many others have been definitely canceled. Investigation of the remaining claims is practically completed, and they are all being set for hearing and disposition at the earliest practicable dates. For some time action was postponed in those claims which were involved in criminal proceedings for the reason that it was thought to be fairer to the entrymen and to the Government to allow the criminal cases to be disposed of before action on the civil side. Some objection to this course has, however, developed among the entrymen, and the delays met with in getting the criminal suits to trial have led the Department to push for hearings in all of the pending claims so that the civil rights of the parties may be determined as promptly as possible. At the same time the criminal cases are being expedited and set for trial so that the innocence or guilt of the defendants may be promptly and definitely determined.

WATER POWER.

There is no more important subject now pending before Congress and the country than the adoption of a definite and comprehensive water-power policy, both with regard to streams upon the public domain and navigable streams not on the public domain. My previous report presented at some length the present views of this Department and urged that the whole subject of water-power development and control should receive the immediate consideration of Congress to the end that constructive legislation should be adopted without unnecessary delay. During the past year the subject has received much attention in Congress and elsewhere. The hearings before the National Waterways Commission were especially important and resulted in a unanimous report¹ which marks at least a definite step forward toward a constructive water-power policy. Bills have been introduced providing for the definite adoption of such a policy with respect to public lands. The passage of two bills by Congress authorizing dams in certain navigable streams and the discussions over

¹ Senate Document No. 400, 62d Congress, 2d session.

these bills and over the forceful messages in which you vetoed them have clearly pointed out the necessity for amendment of the General Dam Act and have suggested the amendments which would be appropriate. It is earnestly hoped that legislation will be promptly adopted with respect to both of these branches of water-power development which will encourage vigorous development without the sacrifice of public interests.

When it became apparent that Congress was not likely to act with respect to water-power sites upon the public domain, a series of conferences was arranged between the representatives of the Department of Agriculture and the Department of the Interior for the purpose of drafting a comprehensive revision of the regulations of these two departments with respect to permits for water-power development in the national forests and on the public domain generally. The revised regulations were put into effect by the Department of the Interior on August 24, 1912, so that their effect might be carefully considered by those who are interested in water-power development; and on November 18, 1912, a largely attended conference with representatives of important water-power interests and of the State conservation, water, and railroad commissioners of California was held in the office of the Secretary of the Interior for the purpose of discussing the relations between the State and National Governments with respect to water power, and especially of considering such modifications in the laws and regulations as might be suggested in order to coordinate the functions of the Nation and the States and make the regulations, whether state or national, sufficiently liberal to encourage vigorous development and at the same time to protect adequately the public interests. The conference demonstrated the feasibility of effective cooperation for the reconciliation or adjustment of the different interests, state and national, public and private. Many helpful suggestions were made, which are now under consideration.

The fundamental purpose of a rightly considered water-power policy is the encouragement and stimulation of the development and use of this great natural resource for the benefit of the public and along lines which will protect and promote the public interest. Its object is development, but development for the benefit of the public. The first public interest is that the water power shall be developed and utilized, but some forms of development and utilization are obviously better calculated to promote the public interest than are other forms. It is therefore essential that we should determine what form of development will best promote the public interest. Our present economic and social institutions are based upon the theory that the welfare of the community is to be promoted largely through the opportunities of personal gain offered to the individual members

of the community. It is through these opportunities of personal advantage that we expect to stimulate the ambition and the energies of private individuals whose activities in the mass promote the welfare of the community and advance the prosperity and the happiness of the people as a whole.

So far as government itself does not undertake the development of water power it is therefore necessary and desirable that we shall offer to those private interests which do undertake its development a sufficient opportunity for profit and a sufficient protection of their investment to secure the largest measure of development for which there is a present market, or for which a market can profitably be created. It must be equally apparent, however, that to the extent to which we offer an unnecessary inducement we are depriving the community of the very benefits upon which the present theories of industrial society depend. We are failing to obtain for the community the advantage on account of which we offer to the individual the opportunity for private gain. It is true that it would be a mistake to undertake too nice an adjustment of the public and the private interests involved and that the benefit of every real doubt should be given to the private investor and developer so that we may make sure that he is given a sufficient inducement to undertake the enterprise. At the same time it is not every investment of capital in such enterprises that must be completely protected; it is not every such enterprise that should be assured a profitable operation. If there is no risk incurred by unwise investment or inefficient management, there will be no adequate incentive for wise investment and efficient management.

Above all we must make certain that those who receive special privileges connected with water-power development shall in fact proceed by appropriate degrees and within appropriate times to develop the available water power to its highest capacity, having due regard to the possibilities of marketing the product. We must make certain that the electric energy thus created shall be made available to the community in appropriate ways at appropriate prices. If it is not to be used for the benefit of the community, but is to be devoted directly to the private purposes and personal advantage of the permittee, some method must be found by which the public will receive its share of the profit which the permittee may make over and above that which is a necessary and reasonable inducement for his investment. There must be appropriate provisions in the permit or in the law under which the permit is issued for the effective enforcement of such conditions as are essential to the public interest.

The theory of our present law in these particulars appears to be that the only way in which the public interest can properly be protected is by providing that the permit may be revoked at any time

by the official who grants it. My previous report discussed at some length the reasons why this theory neither promotes development nor protects the public interest in an effective manner. Instead of meeting directly and adequately the important economic questions involved; instead of attempting to state the essential conditions which should be asserted for the protection and benefit of the public; instead of fully authorizing the officials who grant these permits to limit and define these conditions so that the permit may be revoked only for a breach of the conditions thus established by the statute or by official regulations, our present law seeks to avoid this responsibility by making the permit revocable at any time and without specific reason. So long as this provision in the law was not regarded seriously it offered little obstacle to development in the then limited ranges of hydro-electric enterprise and long-distance transmission. To-day, however, the revocable feature of the existing law is a serious and unjustifiable obstacle to the development and utilization of one of the Nation's greatest natural resources. It should be stricken out of the law, but it should be stricken out only if there are inserted in its place statutory provisions which will define or authorize the appropriate executive agency to define by regulations the conditions and limitations upon which the permit is issued and for a breach of which it shall be canceled.

We must adjust two classes of relations and interests. We must adjust the relations and interests of the Nation and the States; we must adjust the relations and the interests of the public and the permittee. These adjustments are not without difficulties, but they are entirely practicable, and the general lines upon which they should be accomplished are clearly apparent.

It would seem to be axiomatic that where any governmental agency, whether State or Federal, owns or controls a natural resource that agency should take such steps and adopt such policies as will insure that this natural resource is being utilized for the benefit of the community. If the particular agency, State or Federal, is called upon to expend moneys for the protection or improvement of the resource and the resource itself can, without detriment to the community, be made to produce revenues out of which such expenditures can be paid, this course should be adopted. The proposition thus laid down seems to be conceded, reluctantly in some cases but freely in others, by those who are interested in water-power development. As a rule also they concede further that if water power is being developed and used directly by the permittee for its own financial profit and not as a public utility, the particular governmental agency issuing the permit can and should require the payment of such substantial compensation as the facts in any given case may warrant.

Upon the other hand, however, they vigorously contend that much, if not most, of the water-power development upon navigable streams and upon the public domain is, in fact, in the nature of a public utility, in that it is devoted to the generation of electric current which is sold by the permittee for general consumption by the public for light, heat, or power. They now state frankly that this development should be treated as a regulated public monopoly. Some of them contend that for this reason no compensation whatever should be exacted by the Government which grants the permit, but on the other hand those private interests whose representatives are really candid are prepared to admit that public regulation of these utilities is, generally speaking, not yet efficient, and that to the extent to which it fails to be efficient the Government is justified in exacting compensation. They admit further that for the purpose of keeping control of the situation and upon broad general principles of public policy the Government is justified in imposing a nominal compensation even in cases where public regulation appears to be reasonably effective, and that provision for periodic readjustment of this compensation will be a useful check in securing such efficient regulation. Indeed, the only controversy of importance appears to be whether the Federal Government or the States shall control the granting of water-power permits and shall collect the compensation.

So far as concerns water-power concessions upon streams which are not navigable, the Federal Government is directly concerned to-day only where the application is for the use of some portion of the Federal domain. The important question is whether the Federal Government should retain its control over such power sites and upon what conditions the concession shall be issued. The suggestion is made frequently by those who are in one way or another representing either present or future investment in water-power development that such power sites and their control should be turned over to the respective States in which they are situated. It is suggested that in some way or other a failure to do this is a usurpation of Federal power and an unfair discrimination against the Western States. It is interesting, however, to note that the ordinary citizens of these States—are not at all concerned over Federal usurpation or unjust treatment. They recognize that the Federal Government has full legal power to dispose of the public domain as wise policy may direct.

They do not fear Federal usurpation, but seek Federal cooperation in supplementing State and local powers, so that the natural resources shall be utilized for the public benefit primarily of the locality in which these resources are situated, and thus ultimately for the benefit of the Nation as a whole. They suspect that the real purpose of those who urge the turning over of the Federal domain to the States is that

they may escape the longer and the stronger arm of the Federal Government and may take advantage of the more limited resources and governmental facilities of the individual States. While some States have undoubtedly wisely conserved certain of the lands and natural resources turned over to them by the Nation, the story has too often been the acquisition of these lands and resources by special interests or individuals without adequate recognition of the public interest. There is no policy which it would be wise for any State to adopt with respect to these matters in the adoption and enforcement of which it can not be supplemented and assisted rather than retarded by the retention in Federal hands of the powers and the property now held by the Nation. It is precisely this policy of practical cooperation which should be put into effect.

There is no real conflict between the Nation and the States upon this subject. In fact, there can be no real solution of these aspects of the problem until the interests and the functions of the Nation and the States are coordinated and they are working together for the same essential ends. In general all of the streams which are susceptible of water-power development are also of great importance for domestic use, for irrigation, or for navigation. All of them depend to some degree upon protection and aid of some kind and from some source for one or more of these uses. Increasingly that source tends to be the Nation and not the States.

Theoretically the States can develop and protect the streams and the watersheds of the streams within their respective borders, and if these streams are interstate in character the States affected can unite in plans and expenditures for their joint protection and development. Practically, however, the tendency is increasingly in the direction of Federal action upon such matters. Some of the individual States are developing effective policies of water conservation, but it is the Federal Government after all which is called upon to make the chief expenditures for the development of navigation and for the protection of the forest cover around the sources and along the watersheds of both navigable and nonnavigable streams. It is the Federal Government which will be asked to build the reservoirs in which to impound the flood waters at their source so that devastation may be prevented and stream flow be made regular and beneficent. It is the Federal Government which has established and is maintaining the forest reserves by withdrawing appropriate areas on the public domain and purchasing other areas in the Appalachian and other mountains of the Eastern States. The States which are jointly interested in the disposition and development of interstate waters not only do not cooperate with each other, but are in fact antagonistic. No better illustration of this can be found than in the present attitude of State officials and some citizens of Colorado

toward the utilization of the waters of the Rio Grande for the irrigation project in Texas and New Mexico authorized by Congress partly for the benefit of these States but largely in settlement of an international controversy with Mexico.

If, then, the Nation is to perform these important functions; if it is to make these expenditures; if it is to be the arbiter and harmonizer of conflicting State interests, there would seem to be every reason why the Nation should retain the fullest measure of control necessary or appropriate to enable it to perform these functions effectively. This is none the less true because in exercising these functions the chief and controlling purpose of the Nation should be to promote the interests of the States and local communities directly affected rather than to utilize its powers for the purpose of increasing Federal revenue. Where the exercise of these functions develops water power or adds to the value of water power already existing, there can be no sufficient reason adduced why the cost of the protection and the improvement should not be repaid in whole or in part out of the values thus created, nor can there be any adequate reason why the Federal Government should pay the cost of such protection and improvement merely to turn over the revenues to the States or local communities to be used for other purposes than water-power development. Federal expenditures of this character should not be borne wholly by the general taxpayers of the Nation if the expenditures produce special local benefits of the kind described.

It is true that much of the hydro-electric energy developed under Federal permit will be sold to local communities and their inhabitants for general lighting, heating, and power purposes, and that the local communities affected are therefore vitally concerned in the character of the service rendered by the permittee and in the charges for this service. The improvement of long-distance transmission will tend to change this local interest into an interest interstate in character, and this change will lead to the necessary assertion of the Federal power over interstate commerce, as has been the case in the field of railroad enterprise, but until that time comes, and except as it does come, it should be a fundamental principle of Federal water-power policy to relegate to the States and their delegated agencies, whether such agencies be the local municipalities or the public-utility commissions, the important function of regulating the service and the rates of hydro-electric public utilities. It should equally be a feature of Federal policy to utilize the revenues derived from water-power permits solely for the purposes of water development, thus returning to the local communities, not by any nice adjustment of particular expenditures to particular receipts, but as a general policy, the contributions which these communities may directly or indirectly make to the Federal Treasury. Where the local community is efficiently

regulating the rates and services of these permittees, the Federal charge should be nominal in amount, but it should be susceptible of periodic readjustment, so that official inquiry may be made into the extent to which local regulation is efficient, and if for any reason such regulation is not effective, and the permittee is enjoying an unconscionable profit, this profit may be diminished by appropriate increases of the Federal charge. Such a policy can in no way injuriously affect the legitimate interests of the private investor or the local community.

STREAM UTILIZATION.

The streams of the United States are acquiring increased value with the increase in settlement and density of population in both the East and the West. Navigation, power, and irrigation are uses recognized by statute, yet with the increased dependence upon stream utilization more attention will be paid by public and private enterprise to the various means of economizing and conserving streams in order that the uniformity and regularity of their flow, and consequently their usefulness, may be increased. The act of 1897 authorizing the creation of forest reserves in the West states as one object of such reservation the regulation of stream flow through the favorable effect upon streams of the maintenance of unbroken forest areas on their headwaters. Perhaps the most definite legislative recognition of the principle of stream conservation is contained in the so-called Weeks Forest Reserve Act (36 Stat., 961). This law appropriates the sum of \$11,000,000 for the purchase of lands upon the headwaters of navigable rivers within the United States for the stated purpose of conserving navigability.

The administrative officers of the Government have kept full pace with the legislative officers in their recognition of the necessity of taking action to protect the potential usefulness of our streams by fostering constructive development, and to this end have used the powers given them by Congress. For example, under the Withdrawal Act of June 25, 1910, lands whose greatest value is for their use in the development of water powers or in the making of irrigation reservoirs have been reserved from other disposition as far as authorized in said act and are preserved for such power or irrigation use. In pursuit of the same policy the Government has reserved lands suitable for reclamation under the Carey Act in order that they may be put to such use.

In general, the destruction of the natural cover of forest or underbrush at the headwaters of streams increases the high-water flow, decreases the low-water flow, increases destructive erosion and accompanying silt deposition, and so interferes with all the uses of the stream which are valuable to the public, such as navigation, irriga-

tion, and power. This fact, which has been the subject of considerable discussion, has been clearly established by the recent investigations of the Geological Survey in the White Mountains in connection with the administration of the Weeks Act.

The theory of the Weeks Act is that the preservation of natural cover on the headwaters of streams tends to maintain the navigability of these streams, and under this act lands are now being purchased in the eastern part of the country. There are, however, areas of western lands whose situation in relation to the headwaters of streams valuable for power and irrigation is precisely the same as that of the lands now being purchased under the Weeks Act in the East in regard to streams there valuable for navigation. The fact that the Government, in pursuit of the wise policy of promoting the regularity of stream flow, is now buying lands in the eastern part of the country, the title to which should never have passed from the public, necessarily shows that public lands in the West in a similar situation should be retained by the Government in order that the streams whose headwaters they protect may be made as useful as possible. Many such lands are at present so retained in national forests.

I am informed, however, that there exist areas of public lands on the headwaters of streams in the West, and particularly in the arid Southwest, which should be withdrawn from entry because if their acquisition by private interests is permitted the usual destructive effects will follow. Careless cultivation, brush fires, or overgrazing will result in the destruction of the natural cover; erosion will become effective; the destructive power of floods will be increased; the low-water flow will be decreased; stream channels will be filled with debris; reservoirs upon them will become clogged; irrigation effected by their use will be decreased; and such power values as they may have will be greatly reduced. Such lands should be withdrawn in order to protect headwaters of streams and to prevent the necessity of future governmental expenditures in the West under the authority of the Weeks Act or some similar legislation of the kind represented by the purchases now being made of headwater lands in the Appalachian region. It is not proposed to include lands whose value for other purposes is greater than their value to the community for stream protection, and it is not anticipated that the areas thus withdrawn would be large or widely distributed.

The type of reserve thus suggested may be similar to that created directly by congressional action by the act approved February 20, 1909 (35 Stat., 641). This law withdrew from the public domain and erected into a permanent reserve certain unoccupied lands in the San Bernardino Valley, California, that were worthless except for use in connection with the restoration and conservation of underground water supplies needed for the support of the highly profitable

horticultural communities centered about Riverside. The Department has knowledge of other areas of public lands which bear a comparable relation to communities dependent upon irrigation and to power enterprises, and it is my conviction that these lands should be withheld from private acquisition until Congress shall have had opportunity to consider the desirability of erecting from them permanent reserves like that in the San Bernardino Valley.

Ample authority exists for the proposed action in the Withdrawal Act (36 Stat., 847), by which the President is authorized to withdraw temporarily any public lands and to reserve them "for water-power sites, irrigation, classification of lands, or other public purposes to be specified in the orders of withdrawal." The action which it is proposed to take, namely, the reservation of lands at the headwaters of streams for the protection of those streams for public use, is clearly a public purpose, and is therefore authorized by the law. Rarely would the new type of withdrawal affect valuable forest lands, although frequently it might be necessary or desirable to include scattered timber. On this account and because of the provision in section 2 of the Withdrawal Act prohibiting the creation of additional forest reserves in certain States therein named it is desirable that Congress should pass specific legislation recognizing that this prohibition does not apply to the reservation of lands at the headwaters of streams for the protection of those streams for appropriate public uses, whether these uses be irrigation, navigation, or power development, or the preservation of the waters for municipal or domestic purposes.

NATIONAL IRRIGATION POLICY.

Ten years have now elapsed since the passage of the Newlands (or Reclamation) Act of June 17, 1902. That statute and the subsequent legislation which has grown out of it may be regarded as one of the largest and most immediate applications of the policy which has since become known under the name "conservation of natural resources." Its purpose was the use of national funds to reclaim arid lands and secure their subdivision into small holdings, tilled by the owners thereof residing thereon, who were to repay the cost in not exceeding 10 annual installments. The act by its terms included private as well as public lands, and the maximum holding of either which could take water from the Government works was fixed at 160 acres, while the Secretary of the Interior was given authority to require subdivision into holdings of lesser area if the same were sufficient for the support of a family.

Such a direct (though reimbursable) use of public funds for the benefit of property held or to be acquired by private parties (owners or homestead settlers) was a novelty, and the proposal met with

strong opposition in Congress. It was denounced as socialistic, and Members from the Eastern States prophesied that the settlers would repudiate their obligations to repay the construction cost and would obtain relief therefrom through political action. On the other hand, it was convincingly urged that the great and permanent development of the arid country could not safely be intrusted to private enterprise alone and was beyond the financial ability of the several Western States. The bill was passed in the belief that the pledge of public and private faith involved in it would not be violated. Its aim was the wide and permanent diffusion of wealth and of the benefits of the natural resources of fertile land and water among a large number of persons, and its success must be judged upon this basis, not by the accumulation of large fortunes in the hands of a few.

The novelty, magnitude, and inherent difficulty of the experiment demanded that the administrative officers be intrusted with large discretion and responsibility. Therefore, the Secretary of the Interior was given very large and sweeping powers by the act. It appropriates the proceeds received from time to time from public-land sales in the Western States (less 5 per cent) for the irrigation of arid lands therein, and constitutes them into a special fund called the reclamation fund. These receipts, up to June 30, 1912, have amounted to about \$77,000,000, to which should be added \$20,000,000 authorized by the reclamation bond act of June 25, 1910. The total amount expendable under the act has therefore been in the neighborhood of \$100,000,000, and with respect to this expenditure the Secretary of the Interior was given full discretion. He was also authorized to withdraw from entry public lands needed for the construction of irrigation works, and from all but homestead entry public lands to be irrigated from such works, to make contracts for such construction, to acquire land for the same purpose by purchase and condemnation, to fix the limit of area (not exceeding 160 acres) necessary, in his judgment, for the support of a family and limit the area of entries accordingly, to estimate the cost of the works, and fix by public notice the charge per acre to be paid by settlers in reimbursement thereof. The act made the water rights acquired under it appurtenant to the land irrigated, made beneficial use of the water the basis, the measure, and the limit of the right thereto, and forbade sales of water rights to private land-owners, unless resident upon or in the neighborhood of land for which the right was sold.

The first problems that pressed for solution after the passage of the act were those of engineering and construction. They have been solved with notable success. Many of the larger works, as, for example, the Shoshone, Pathfinder, and Roosevelt Dams and the Gunnison Tunnel, take rank among the great engineering achieve-

ments of our day; and, while we were not entitled to expect and have not achieved errorless results in the works as a whole, it may be said that they are well designed and carefully built to endure and serve their purpose permanently. This very merit has given rise to not a little criticism on behalf of the settlers who are to pay for the works, on the ground that the construction cost has been excessive. No general statement of this sort is justified. If a proper basis of comparison is taken it is believed that the cost of works built by the Reclamation Service is less than the cost of those of equal magnitude and efficiency constructed by private enterprise. It must be remembered that when the Reclamation Act was passed practically all of the large projects which could be constructed at low cost had been undertaken by private capital, so that one of the chief arguments for the passage of the act was that the projects remaining to be undertaken were so difficult that no other agency than the National Government could possibly undertake the work. Many private projects have brought down their apparent construction cost by building unsubstantial structures which must be wholly renewed within a few years, whereas those built by the Reclamation Service under like circumstances will last indefinitely. It follows that the ultimate construction cost of private projects so built will be very high, though it is disguised in the statistics frequently published. Moreover, the cost is generally stated as so much per acre of the land irrigated, and the Government estimates have been based upon a careful attempt to secure an adequate supply of water for every acre in the project for nearly every year, whereas many private projects have attempted to cover a much larger acreage with works of the same capacity and thus take chances upon the probability of obtaining water. This reduces the estimated cost per acre of such private projects, but subjects the farmer to a risk which should not be put upon him and which ultimately will have to be removed by additional construction cost for storage or other new water supply.

The problems confronting the Service are rapidly becoming those of administration rather than engineering. They concern the use of the works which have been constructed, the distribution of water through them to the settlers, and the realization by the settlers and the public of the benefits intended by the act. They are human problems and their solution requires the doing of justice in dealing with many thousand farmers and the maintaining of a spirit of cordial cooperation with them. For this reason, as indicated in my last annual report, the project engineers in charge of the building works are being replaced as rapidly as circumstances warrant by irrigation managers selected not only for their knowledge of the physical methods of operating a project, but largely for their business and

executive qualifications. Undoubtedly some ground for past criticism exists in particular cases, but it must be remembered that among the many thousands of irrigators on the Government projects there must inevitably be a considerable percentage of the unskilled and unfortunate who suffer disappointment, which results in complaints against the officials in charge of the project. Many of the farmers on the 14,000 farms or more to which water is being delivered are thoroughly qualified for this form of agriculture, but many others have never before practiced irrigation. Some have come from the cities and are wholly ignorant of country life in general and of arid conditions in particular. Pioneering on a reclamation project is still pioneering, requiring courage, energy, and resolution to overcome its hardships. The unsuccessful men are unable to pay their installments of water charges. This renders their entries or water-right purchases subject to cancellation, a harsh remedy which is not applied if there is good cause to believe that leniency would result in ultimate success. Such cases are carefully investigated before cancellation is ordered. In most cases of failure it is found that little, if any, permanent improvements have been made and that the lands were originally taken up for speculative purposes. In such cases prompt cancellation is effected in order to permit some other settler to enter upon and utilize the land. The greatest present need of the projects is that of bringing to the reclaimed land the class of settlers who are competent to make use of its opportunities, and of encouraging or stimulating them to produce larger average crop values such as to justify the labor and cost of irrigation. It is commonly supposed that the difficulty of reclamation work is solved when water is had and the works are completed; on the contrary, this is only the beginning. Financial or technical questions of building shrink into insignificance compared with the more difficult human problem of dealing with thousands of settlers and of inducing them to take action along lines which will lead to their greatest individual success.

Until the passage of the act of June 25, 1910, the Department was without authority to keep new settlers away from reclamation projects during the time of construction. Consequently, as soon as a reclamation withdrawal was made, settlers flocked in, took up all the lands, and waited for the construction of the works which were to furnish them water, a process which occupied many years and led to very great complaint on the part of the settlers. Among them were many so-called "professional pioneers," namely, the more restless members of the community who are always looking for something better beyond the horizon. They frequently took up the lands in the hope of selling out at an advanced figure after water should have been supplied. In other words, their purpose was speculative, and the speculation, if successful, would saddle the newcomer pur-

chasing from them with the burden of the profit the speculator had made out of the transaction. Settlers of this kind neglected to till the soil themselves after water was available, or did as little as possible without endangering their entries, hoping from year to year to dispose of their interest in their farms. In the meantime thousands of acres of land for which a large public investment has been made to furnish water are being held out of use because the owner is not ready or able to utilize the ground. The result is a low average of crop production and the presence of considerable tracts of uncultivated or poorly cultivated fields. This discourages newcomers and adds to the labor of the men on the ground because a single acre of weeds will furnish seeds enough to injure an entire section of tilled lands. What is needed is not the relaxation of rules which prevent speculation, but the discriminating encouragement of the man who has actually cultivated his entire holding to the best advantage. No encouragement should be given to the speculator or inefficient farmer who is trying to hold a piece of Government land out of cultivation in order to gain the unearned value thereof which arises from the toil of others and the expenditure of public money.

From this point of view the objections frequently made to the fixing of a less area than 160 acres as the limit of a single holding, called a "farm unit," which can be patented under the homestead law within a reclamation project, or the acquiring of a water right therefor, are peculiarly without merit. Many of the settlers who went upon the withdrawn lands before the construction of the works and made entry for 160 acres protest vigorously against being required to conform their entries to farm units of 80 or 40 acres. These units are fixed in each project at such number of acres as "may reasonably be required for the support of a family," as the statute prescribes. The 160-acre limit prescribed by the general homestead law was based upon the supposition that that area was sufficient for the support of a family on the new lands which could be settled and farmed without irrigation. The public interest demands that the land should be worked by the owners thereof and should support in comfort as many families as possible. The entryman should unquestionably be given the benefit of the doubt. Some farm units may have been made too small; the standard of "reasonable requirements for the support of a family" may have been too low in some instances; but the investigations, the observations, and the actual experience of the Reclamation Service seem to show that these things have not thus far occurred. To give one entryman 160 acres of public land where 80 is sufficient to support his family makes him a speculator with reference to the excess and enables him to levy tribute upon the settler who ultimately buys it. The same is true with respect to water rights for private lands in excess of the farm unit area.

The act of August 9, 1912 (37 Stat., 265), already referred to, extends the prohibition as to excess holdings beyond the time when patent is issued and until the "final payment in full of all installments of the building and betterment charges," and provides for forfeiture of such excess. The said act further discourages speculation by expressly placing upon the purchasers of water rights for private lands the same duty of cultivation and reclamation (one-half the irrigable area before certificate of water-right issues) that was imposed by the original act upon the entrymen of public lands. Those who desire to hold lands within reclamation projects for speculative sales or for present leases to tenants object to the provisions of the reclamation law which require them to reside on or in the neighborhood of the land for which water right is purchased. In my judgment, such ownership should not be encouraged and the rule of residence as now construed should not be relaxed. Nevertheless, as I pointed out in my report of last year, there are good reasons for allowing an irrigator, whether on public or on private lands, to postpone the beginning of his residence until he has had opportunity to put in crops and, if possible, to obtain from the land the means of supporting himself and his family. For this reason the Department's draft of a bill to amend the reclamation law proposed to remove homestead entries under the reclamation act from the operation of the general homestead law in this respect, to call them by the distinctive name of "reclamation entries," and to allow such a postponement of the establishment of residence until two years after the entry is made. I am still of the opinion that such is the true solution of the difficulties presented.

The requirements for repayment of the cost of the works by the settlers in not exceeding 10 annual installments have given rise to many complaints. The schedules of repayment first established made these installments equal, but, as stated in my last report, they have been generally graduated so that they are small during the early years, when the irrigator is subduing his land and making it fit for efficient crop production, and large in the latter part of the 10 years, when it may be supposed that the production will be sufficient to carry the burden. Some of the objectors have not been satisfied with this concession, but have demanded an amendment of the law which will extend the period of repayment from 15 to 20 years instead of 10. Much of the agitation for this change has taken place in those projects where the construction cost has not yet been determined and therefore where no annual installments have yet been announced, the water being distributed to such lands as can now be served under an annual rental contract at a price approximately equal to the expense of delivery without regard to the construction cost. It should be noted that under such circumstances the water user may bring his farm into the fullest productive condition before being required to

pay any part of the construction cost whatever, and therefore, that there is less basis there than elsewhere for the proposed lengthening of the reimbursement period.

The chief beneficiaries of such a lengthening would be those men who own extensive tracts of private land within the reclamation project and have been required to sell them in order to secure water rights for them under the restrictions of single holdings above referred to. Such sales are made on time and partial payments thereon are often required annually. The purchaser buys the land from the owner and subsequently buys the water right from the Government. Before the initiation of the project such land was of little or no value, but the prices at which it is now sold without water are frequently very high and give very large speculative profits to the former owners. A purchaser who is under contract to pay annual installments upon the purchase price of \$200 per acre for his land objects to the burden of the installments annually due on the Government water charge, though all such installments taken together may amount to only \$50. In other words, the demand is that the huge speculative profit shall be first paid and that the reimbursement of the Government for the actual cost of the works should be postponed. This demand is fundamentally vicious and unjust. It not only diverts to private speculators the benefits of a great enterprise undertaken for the public benefit, but it inevitably postpones the day when the settlers are to take over the management of the works as is contemplated by the Reclamation Act, and it prevents the replenishment of the reclamation fund for the development of other projects. The public interest demands that the settlers should, as soon as consistent with the return of the Government investment, assume responsibility for their own welfare and relieve the Federal Government from guardianship over them; also that the investment be returned at the earliest practicable moment and the benefits of the act be thus extended throughout the West with the utmost rapidity practicable. The postponement of payment therefor means local favoritism and large and frequent private profits at the expense of the general public.

In this connection I desire to emphasize the interest of every citizen of the United States, and particularly of every farmer, in the East as well as in the West, in promoting a faithful fulfillment by the settlers on reclamation projects of their obligations to repay to the Government the cost of the works and the cost of operating and maintaining them until they are turned over to such settlers. Various schemes of Government aid in agricultural development are proposed and have been adopted in other countries. Many of these proposals, if based on a conservative estimate of the resulting increase in productivity, are fundamentally sound in proportion as the obligation of repayment is sacredly fulfilled. Therefore every pro-

posal for the repudiation of any part of the cost of reclamation works, or of the cost of their maintenance and operation, or for the unnecessary postponement of the payment thereof, is a blow struck at agricultural development in every part of the United States. Let it once be known that the first great experiment in the direct use of Government revenues to aid individual farmers to increased crop production has resulted in the repudiation of their obligations to repay, or even in a formidable attempt to avoid or unnecessarily to postpone payment, then all hope of the continuation of such a beneficent policy, to say nothing of its extension to regions which have not yet felt its benefit, will be at an end.

LOWER COLORADO RIVER.

With my previous annual report I transmitted to you, and you thereafter submitted to Congress, documents giving the details of the work then done along the lower Colorado River in Mexico, under the appropriation of \$1,000,000 made by Congress on June 25, 1910, for the purpose of protecting the lives and property interests of the citizens in the Imperial Valley, California. These documents also included the report of a board convened by your direction to make a careful study of the work accomplished and to suggest plans for future operations. This board recommended an immediate appropriation to meet emergencies, but such appropriation has not been made. The work has, therefore, been necessarily confined to such operations as were practicable with an unexpended balance of about \$200,000 available during the past year from the appropriation of June 25, 1910. It was decided to restore the levee north of the Abejas River and raise the Volcano Lake levee so as to prevent the flow of the Colorado River at flood stages from reaching Imperial Valley by way of New River. A patrol was kept on the levee north of the Abejas River until the floods of 1911 had subsided. About 14 per cent of the yardage of the levee was lost by the flood of 1911. No further damage was done during the flood of 1912. In December, 1911, the levee north of the Abejas River was repaired and brush tappings along the river base were constructed. The railway which had been built to carry material to the site of the dam for the closure of the Abejas break was taken up and the steel returned to the Southern Pacific Company, by which it had been furnished.

The enlargement of Volcano Lake levee was begun on January 14, 1912. The work consisted of raising the levee 4 feet with earth and adding a paving of rock on the water side thereof to protect the earthen slope from erosion. The levee has a crown of 12 feet and side slopes of 1 on 2. It has a length of about 8 miles and the work was completed June 2, 1912. The contractor's equipment was removed and the work finally accepted September 15, 1912. The total amount

expended on the work up to October 31, 1912, was \$938,872.74, leaving a balance of \$61,127.26 with which to pay outstanding liabilities.

In addition to the work described, further physical investigations and surveys of the delta were made, the results of which will be of service in connection with such further operations as may be provided for. All of the material and equipment borrowed from the Southern Pacific Company has been returned, and all government property purchased for the work and not used has been disposed of and the funds realized from sales have been accounted for in the usual manner.

The most important feature of the report of the advisory board above referred to was the recommendation that by agreement with the Government of Mexico an international Colorado River Commission should be created, to be composed of Mexican and American engineers with authority to investigate and report to their respective governments a basis for the final adjustment of all questions affecting the use and control of the waters of the Colorado River in which the two countries have a mutual or related interest. Negotiations for this purpose are now actively in progress with the Government of Mexico, and the Department of State reports that there is every reason to believe that an understanding will be reached and an agreement signed in the near future. It is of great importance that this should be done.

In further reference to this subject attention is respectfully invited to the message of the President, dated February 2, 1912, transmitting data of this Department, published as House Document No. 504, Sixty-second Congress, second session, and the message of the President, dated June 14, 1912, transmitting a letter from this Department recommending further appropriations for the work, and published as Senate Document No. 846, Sixty-second Congress, second session.

RECOMMENDATIONS CONCERNING INDIAN ADMINISTRATION AND OTHER MATTERS.

Under the heading "Office of Indian Affairs" I have presented at some length my views of the present administrative conditions in that important branch of the public service and have made certain recommendations for their improvement. In reporting upon the work of other bureaus of the Department specific recommendations are made upon various matters directly affecting these bureaus, respectively.

The needs of the Patent Office for larger quarters and a new building are presented in connection with its report, but the important records of the other bureaus of this Department should be provided with a properly constructed, fire-proof, central filing place at the earliest practicable date. A Hall of Records for the entire depart-

mental service in the District of Columbia is an alternative suggestion worthy of careful consideration. So long as this need is not met in some appropriate way there is constant and real danger of irreparable loss from fire and other causes of destruction.

The events of the last year have confirmed and emphasized the urgent need for a Bureau of National Parks. Bills for this purpose have been introduced in the present Congress and have been given some attention in committee.

I renew the recommendation made in my last report for the enactment of legislation providing for the retirement and pensioning of civil employees of the Government.

OFFICE OF THE ASSISTANT ATTORNEY GENERAL.

The following table shows the number of matters received and disposed of by the office during the year ending October 1, 1912, but only to the extent of matters formally docketed. It does not include a multitude of matters that are not formally docketed:

Work of office of Assistant Attorney General.

	Public lands.		Pensions.		Indian.	General opinions.	Disbarment.	Miscellaneous.	Total.
	Appeals.	On re-hearing.	Appeals.	On re-hearing.					
Pending Oct. 1, 1911.....	1,280	101	448	5	38	18	3	173	2,066
Received to Oct. 1, 1912....	3,314	476	2,201	43	17,569	265	15	10,900	34,788
Total.....	4,594	577	2,649	48	17,607	283	18	11,073	36,849
Disposed of Oct. 1, 1911, to Oct. 1, 1912.....	2,487	504	1,847	44	17,003	273	11	10,822	33,641
Balance.....	2,157	73	802	4	4	10	7	251	3,208

In illustration of the comment that these figures, large as they are, do not fully show the number of matters requiring the attention of this office, a record of that section of the office dealing with Indian matters is significant. The record referred to was kept during the months of January to June, 1912, to include undocketed as well as the formally docketed matters submitted for action. While the latter during that period amounted to 8,839, the actual number of matters considered and disposed of was 20,067.

The growth of work in this office is shown in a note accompanying the estimates for the Department and supporting the recommendation for an increase in the force. Docketed cases and matters received for action were, in the year ending October 1, 1909, 4,755; 1910, 13,801; 1911, 16,609; and 1912, 34,788.

The arrears, October 1, 1911, were 2,066; October 1, 1912, 3,308. The continued growth in the number of arrears is already embarrassing; and with the present insufficient number of attorneys and with

the maintenance of the ratio of increase in the demands upon the office, the arrears must very soon become overwhelming. Moreover, of the arrears two-thirds involve contested land matters. This is highly prejudicial to the interests of entrymen under the public-land laws. It must be apparent to anyone, and experience has taught that it is true, that it is impossible to increase the proper disposition of public-land appeals without increasing the force.

It is proposed elsewhere to relieve this office of the work in pension-appeals matters. But this will in no manner mitigate the evil of accumulating arrears in public-land matters. There is but one relief for that, and that requires an increase in the working force.

Aside from the adjudicating duties of the office and the various other items shown in the above table, the litigation in the local courts is now of such a volume as to require, during term time, from October to July, a large amount of the time of one of the assistant attorneys as well as demanding a great amount of the time of the Assistant Attorney General himself in preparing for and trying the cases in court. During the year there has been final judgment in the Court of Appeals in 7 cases, in the Supreme Court of the District of Columbia in 11 cases, in all of which the Department was successful. There is 1 case in the Court of Appeals, argued and submitted, but not yet decided, and 2 cases in the same status in the lower court. These figures do not, however, include interlocutory matters. There are still pending in the Court of Appeals 2 cases, in the Supreme Court 22 cases.

In addition to this, attention is called to the fact that in response to requests of committees of Congress for reports on the great mass of bills affecting this Department such reports must be largely prepared in the office of the Assistant Attorney General.

In my annual report for the fiscal year ended June 30, 1911, I called attention to the necessity for increased appropriations for the office of the Assistant Attorney General "to provide for a greater number of specially qualified assistants," and stated that if the force were strengthened as suggested by me "the conflicting interests of the claimants and of the Government would be more carefully and correctly decided than is now possible, and that the business" of that office "will be expedited, and that those who have contested claims before the Department for adjudication will be better satisfied."

Notwithstanding this recommendation, and the further fact that in the estimates for the Department for the past fiscal year a small increase was asked for along the lines suggested by me in my report, Congress not only did nothing with the recommendation, but, indeed, refused to allow the increase asked for in the estimate. Had the recommendation received sufficient consideration and been acted upon, a proper reorganization of the force in the office of the Assistant

Attorney General could have been had, and the arrears in the disposition of the public-land appeals would be in the process of constant reduction while the cases would receive more extended consideration than now is possible.

The reasons for the recommendation in my last report are even more urgent now than they were then.

GENERAL LAND OFFICE.

The work in the General Land Office during the past year has been brought up to date with a few minor exceptions. In homestead cases patents are being written within four months from date of proof. This length of time intervening between the date of proof and the issuance of the patent is not objectionable as it allows time within which to guard against hasty action.

The year 1912 saw the completion of 100 years of existence of the General Land Office as a separate bureau. At the time of its creation, May 7, 1812, the organization of the Land Office consisted of 10 persons, including the commissioner. There were 19 district land offices and 1 office of surveyor general. At the close of the fiscal year 1912 the employees in the field and in the city of Washington numbered 1,417, with 102 district land offices, 13 offices of surveyors general, and 12 field divisions. The centennial was celebrated by the employees of the office with appropriate exercises.

The work of the field force during the past year has evidenced the high efficiency of that force. Although the appropriation was reduced by \$100,000, which necessitated the reduction of the field force, there were more entries examined and reported upon during the year 1912 than during either of the two prior years when a larger number of agents were employed and a larger appropriation was available. Examinations in the field are made of Carey Act projects, State selections, railroad selections, townsite cases, timber and stone entries, isolated tracts, forest lieu selections, Indian allotments, water companies in cases of desert-land entries, in addition to cases wherein allegations of fraud are made.

Considerable progress has been made by the field force in the disposition of coal-land investigations in Alaska. There have been submitted reports on 454 claims during the year, and out of 1,129 coal locations before the General Land Office there are only 199 which have not been investigated; of the latter number, 144 have been either canceled or held for cancellation for failure to submit applications for patent within the time required by law, leaving only 55 pending claims which still require some investigation. It is expected that during the present field season these remaining claims will be investigated. During the year adverse proceedings were directed against 188 claims, which brings the total up to 300 on which

hearings have been ordered; of this number, 219 are at issue, and every effort will be made during the coming year to dispose of these cases.

Another important work in the field is the California oil land investigations. There are included in withdrawals in California over 1,500,000 acres containing valuable petroleum deposits. Of the lands withdrawn approximately 100,000 acres are covered by pending entries and selections. Much of the remainder is covered by mineral locations of oil, gypsum, and asphaltum. A number of special agents and mineral inspectors of the field service are devoting almost their entire time to the work of investigating these entries and selections and in assisting the officials of the Department of Justice in suits which have been or are to be instituted for the recovery of title to a large part of these lands to which patents have issued under applications for the lands which alleged that they were nonmineral in character.

The total cash receipts from the sale of public lands, including fees and commissions on both original and final entries, for the fiscal year 1912 were \$6,671,718.54. Miscellaneous receipts were as follows: From sales of Indian lands, \$2,284,538.37; reclamation water-right charges, \$914,542.31; sales of timber in Alaska, depredations on public lands, sales of Government property, and copies of records and plats, \$102,248.78, making the aggregate total of cash receipts of the General Land Office during the fiscal year 1912, \$9,973,048, a decrease of \$1,116,879.60 from the preceding year.

The total expenses of district land offices for salaries and commissions of registers and receivers, incidental expenses, and expenses of depositing public moneys during the fiscal year ended June 30, 1912, were \$850,121.04, a decrease of \$20,120.96. The aggregate expenditures and estimated liabilities of the public-land service, including expenses of district land offices and surveys, were \$3,573,692.88, leaving a net balance of \$6,399,355.12, including Indian moneys.

The total area of public and Indian land originally entered during the fiscal year ended June 30, 1912, was 14,574,688.82 acres, a decrease of 3,064,410.72 acres as compared with the area entered during the year 1911.

The area patented during the fiscal year was 10,135,475 acres, a decrease of 2,137,020 acres as compared with the fiscal year 1911. Of this area 5,011,948 acres were patented under the homestead law.

During the past year there were approximately 182,800 acres of agricultural lands in national forests opened to settlement and entry under the act of June 11, 1906 (34 Stat., 233).

PUBLIC SURVEYS.

The success of the direct system of surveys after the second year's work is manifest. The expenses attending the execution of surveys

under this system have been greatly diminished by the adoption of business methods in the management of the field force and in the matter of supplies; the expenses of equipment of surveying parties in the field are lessened because of a sufficient number of instruments and government-owned animals and wagons now on hand, which were purchased from previous appropriations. On June 30, 1912, there were 87 parties in the field, and in October the number was increased to 106.

TEXAS-NEW MEXICO BOUNDARY.

The returns of the survey for the reestablishment of the boundary line between Texas and New Mexico, authorized by the resolution approved February 16, 1911, have been examined in the General Land Office, and the record, duly attested and certified to by the commissioners on the part of the Government and Texas, has been submitted for your approval. A request has been made, however, that some controverted questions be further considered before you approve the survey.

CAREY ACT.

The number and acreage of applications for segregation filed under the Carey Act during the past year show a marked decrease from the preceding year, due principally, it is thought, to the fact that the easiest and cheapest projects were naturally taken up first and that the field of operation is becoming more restricted. As a result of the practice of thoroughly investigating applications under this act, fewer merely speculative projects will be presented to the States or will be submitted by the States to the Department. During the year 1912 applications for but 184,697.39 acres were filed. Applications aggregating 97,917 acres were approved. In applications under the act of March 15, 1910 (36 Stat., 237), 1,416,474.04 acres were applied for, applications involving 593,189.28 acres were rejected, 214,211.62 acres were withdrawn, and 1,064,572.89 acres were restored upon the expiration of the year granted by the act or upon relinquishment.

STATE AND TERRITORIAL GRANTS.

During the past fiscal year there were approved to the States and Territories an area of 181,280.62 acres, of which 147,988.16 acres were school-land selections.

RAILROAD GRANTS.

During the fiscal year 1912 there were patented on account of railroad and wagon-road grants an area of 25,393.87 acres. This is considerably less than the area patented in 1911, on account of the suspension of the issuance of patents pending decision as to whether the patent should contain a mineral-exclusion clause.

CHIPPEWA LOGGING, MINNESOTA.

During the past fiscal year there were logged under contracts on ceded Chippewa lands 102,245,370 feet of timber, of the value of \$878,717.39, as compared with 80,005,150 feet, valued at \$572,830.78, during 1911.

SALES OF CHIPPEWA PINE TIMBER.

On October 21, 1911, a sale of pine timber on ceded Chippewa lands, Minnesota, was held at Cass Lake, Minnesota. This timber was offered at previous sales, but not sold for want of bidders. Bids were accepted for 4,815,000 feet of white pine and 2,016,000 feet of Norway pine, the total price being \$34,524.74, an average of \$5.06 per thousand feet. The price paid for timber on ceded Chippewa lands sold at the different sales is \$6,811,968.70.

LEGISLATION.

Since the last annual report of the Commissioner of the General Land Office the most important legislation enacted affecting the public-land service was the act approved June 6, 1912 (37 Stat., 123), commonly called the "three-year homestead bill." At this time it is too early to predict results of this legislation, but it will undoubtedly increase the work in the General Land Office during the coming year in the examination of proofs which will be submitted under the new law. The Department has recently determined that this legislation is operative in the Territory of Alaska.

An act of Congress was approved April 30, 1912 (37 Stat., 105), whereby the privileges of the act of June 22, 1910 (36 Stat., 583), are extended to the several States, thus permitting the States to select in satisfaction of grants for educational or other purposes lands withdrawn or classified as coal lands (subject to the coal reservation).

COMMISSIONER'S RECOMMENDATIONS.

In his annual report for the year 1912 the Commissioner of the General Land Office again calls attention to the inadequacy of the salaries paid to the higher employees of the Land Office, and renews his recommendation for a readjustment, so that a substantial increase may be made in the salaries of those who perform the higher grades of work in that office.

I concur in the recommendations again made by the Commissioner for legislation along the following lines:

(a) The reorganization of the Land Office by the enactment of legislation providing for the creation of a board of law review consisting of five members, to have authority to decide, as a judicial body, matters before the General Land Office, with a right of review in

the commissioner and appeal to the Secretary. Legislation of this kind would result in relieving the commissioner of a great deal of the detail in passing upon and signing decisions and letters of an important character. It would give him more time to devote to the important executive duties which devolve upon him.

(b) The abolishment of the office of receiver in the local land offices and the substitution of a bonded civil-service employee at a smaller salary than now allowed to the receiver; this would result in a saving to the Government of a considerable sum each year.

(c) The enactment of legislation providing for the taking of final proofs in homestead and desert-land entries on the land involved. This would obviate a long trip from the land to the local office and put the homesteader to no greater expense than he is put to under the present conditions. It would also save considerable time now consumed in investigations made subsequent to the offering of proof.

(d) The amendment of the compulsory attendance act of January 31, 1903 (32 Stat., 790), so that in contest cases the attendance of witnesses living within 100 miles of the place of hearing may be secured. At present, if a witness resides outside of the county in which hearing is held, his testimony must be taken by deposition. Considerable confusion relative to the adjustment of fees of witnesses arises under the present law, which will be obviated by the suggested amendment.

(e) Legislation providing for the regulation of professional locators and of advertisements in relation to the disposition of public lands. The General Land Office is still in receipt of frequent complaints of hardships suffered by persons who have sought to enter public lands by reason of deception on the part of persons to whom payments were made to secure for them locations. Legislation of this character is desired for the protection of the honest home seeker against the methods employed by unscrupulous locators.

GEOLOGICAL SURVEY.

The scientific investigations of the survey have been continued along lines similar to those followed in other years, and the usual number of contributions have been made to the knowledge of geology and related subjects. The appropriations for the work of the United States Geological Survey for the fiscal year 1912 aggregated \$1,507,920. While the appropriations made directly for survey work show an increase of only \$30,480 over those of 1911, there was a notable increase in the amount of work done by the field service. The funds available through cooperation with other Federal bureaus and with the States amounted in 1912 to 27 per cent of the direct appropriations and showed an increase of 42 per cent over coopera-

tive funds of the preceding year. This increase in the field work involved a large increase in the work of the Washington office, to which was added the greatly increased service rendered the Secretary's office, the General Land Office, and the Office of Indian Affairs in connection with public-land administration. Although the practical economic work of the survey has greatly increased during the year, the investigations which have been steadily carried forward have yielded some noteworthy scientific results, and important contributions, based on long-term studies, have been made to the knowledge of geology and related sciences.

NEED OF SURVEY BUILDING.

The present rented quarters of the Geological Survey are wholly inadequate and unadapted to its needs. Scientific data, including unpublished maps and detailed stream gauging records and other material produced at an estimated cost of nearly \$5,000,000, but of a much greater possible value to the Government, and in part irreplaceable, are in constant danger of destruction by fire, while the noisy location, poor light, dirty conditions, and congestion in the building are limitations on economy and efficiency which seriously hamper all efforts for better administration. The crowded and insanitary condition which prevails can be described without exaggeration as in large part comparable to a sweatshop. The large amount and the high class of scientific production that is expected and required of the Geological Survey, as well as the danger to invaluable public records, demand a remedying of these conditions which shall bring the survey quarters more nearly in accord with modern office requirements.

CLASSIFICATION OF THE PUBLIC LANDS.

In this work, wholly economic in character, the highest results are possible only where there is full knowledge of the scientific data pertaining to the public domain and its resources. The land classification board of the survey draws heavily and constantly not only upon the results of current scientific investigation, but upon the conclusions of the geologists and engineers who have contributed to the survey's published and unpublished data during the past 30 years. On May 1, 1912, the land classification board was formally recognized as having the rank of an independent branch within the Geological Survey. The increasing amount and the more exacting character of the work of land classification are indications of the awakened interest in a businesslike administration of the public domain. To encourage development and at the same time to enforce wise utilization by preventing partial or wasteful use is to protect the public interest. With the different values of the land made known by adequate examination,

the highest use can be determined and provided for in so far as the statutes are in accord with economic law. Under the Withdrawal Act of June 25, 1910, the Geological Survey recommended during the year more than one and one-fifth million acres of oil reserves and almost one and one-third million acres of phosphate reserves, based on geologic data, and more than one-third million acres of water-power sites and 60,000 acres of irrigation-reservoir sites, based upon hydrographic and topographic surveys, and 86,000 acres of public water reserves essential to the control of the public grazing lands. As regards the classification of coal lands, the year has been notable in that for the first time the acreage classified and restored has much exceeded that withdrawn for classification, so that at the end of the year there was a substantial reduction in the area of outstanding land withdrawals. More than 800,000 acres were classified as coal land and valued at nearly \$15,000,000, while nearly 14,000,000 acres were classified as noncoal lands. (Tables will be found in the appendix.)

GEOLOGIC BRANCH.

Geologic surveys and investigations were continued in 40 States by a force of 109 geologists. Fifty-nine per cent of the appropriation was expended in the public-land States. Systematic detailed surveys of mining districts were continued in Colorado, Arizona, Utah, Idaho, Montana, Oregon, and Nevada, and general and detailed geologic and paleontologic investigations were conducted in all parts of the country. A large amount of geologic work was done in the coal fields of the public-land States.

In Alaska 13 field parties covered 14,460 square miles by reconnaissance topographic surveys, and 246 miles by detailed topographic surveys. Reconnaissance geologic surveys were made of 10,550 square miles and detailed geologic surveys of 496 square miles. In addition 8,000 square miles were covered by exploratory geologic surveys, and investigations of the water supply in placer districts covered approximately 8,000 square miles, including 68 steam-gauging stations and 309 measurements of stream volume. Twelve of the 30 mining districts of Alaska which are being developed were visited.

The work of the Mineral Resources Division consisted in the preparation of the reports on the mineral resources of the United States for the calendar years 1910 and 1911. The volumes, prepared under the direction of geologists who have specialized in the subjects treated by them, have under this treatment come to be a cyclopedia of information concerning the mineral resources of the United States. Knowledge of the storehouses from which the Nation's future supplies are to be drawn is considered to be of prime importance, of greater value, indeed, than the record of past mining achievements

which is presented in the statistical compilations of the report. Recent volumes have included general maps showing the areas in the United States producing the precious and semiprecious metals, coal, iron, ore, petroleum, natural gas, cement materials, gypsum, salt, and various other minerals. A special effort has been made during the year to secure prompt returns from the mineral producers, and thus an earlier publication of the separate advance chapters of the report, which has met with gratifying results.

TOPOGRAPHIC BRANCH.

The new area topographically mapped was 28,136 square miles, making the total area surveyed to date in the United States 1,160,396 square miles, or 38 per cent of the entire country. In addition 5,274 square miles were resurveyed, making the total area of surveys during the year 33,410 square miles. Topographic surveys were also prosecuted in Hawaii to the extent of 281 square miles. The topographic field force numbered 161. In addition 60 technical field assistants were employed during the whole or part of the field season.

WATER RESOURCES BRANCH.

With the same appropriation (\$150,000) as that of 1911, the scope of the work has been considerably increased, due to the larger amount of cooperative money furnished by certain States, and in the case of New Hampshire by the necessity for intensive hydro-metric investigations in the White Mountains under the authority of the Weeks Act. River gauging stations were at the close of the year being maintained at 1,232 points, exclusive of those in Alaska and Hawaii. In addition, records were received from 186 stations maintained by private enterprise. A large amount of work was carried on in the public-land States relating to the classification of the public lands, besides investigations of underground and surface water conditions throughout the country. Sixty-nine per cent of the appropriation was spent in the public-land States.

EXAMINATIONS UNDER WEEKS ACT.

Work under this law (act of Mar. 1, 1911) was vigorously prosecuted by the survey in North Carolina, Virginia, West Virginia, Tennessee, South Carolina, Georgia, and New Hampshire, resulting in the submission during the year of 10 favorable reports, covering 1,869,845 acres.

PUBLICATIONS BRANCH.

The number of books distributed during the year was 437,637 and the number of maps and geologic folios 688,983, a total of 1,126,620. Of these, 529,656 maps were sold. The amount of money received

and turned into the Treasury from the sale of publications was \$25,755.22, an increase of \$4,171.67 as compared with the figures for 1911.

ADMINISTRATIVE BRANCH.

The official mail other than requests for publications shows an increase of approximately 6 per cent over that of the preceding year. The roll of survey members holding secretarial appointments numbered at the close of the year 880 persons, an increase of 18. The library received during the year 12,886 books and 1,124 maps.

RECLAMATION SERVICE.

The act of Congress approved June 17, 1902, known as the "Reclamation Act," creates a fund for the reclamation of arid lands from the moneys received from the sale of public lands in certain of the Western States and Territories, excepting the 5 per cent of the proceeds of such sales set aside by law for educational and other purposes. The actual receipts from this source to June 30, 1911, were \$71,720,349.08, and the estimated total receipts to June 30, 1912, including \$229,222.67 from sale of townsite lots, are \$77,612,201.41. The net investment of this fund in reclamation works on June 30, 1912, amounted to \$69,858,216.93.

The act requires the Secretary of the Interior to determine, with a view to its return to the reclamation fund, the estimated cost of construction, and entrymen and private landowners receiving water from reclamation projects are therefore required to contribute their proportion of the cost of construction, operation, and maintenance of the project wherein their lands are situated. The cash receipts from this source to June 30, 1912, were: Building repayments, \$2,156,442.75, and operation and maintenance, \$877,825.82.

In addition, sales of water to towns and cities, leases of power developed on the projects, rentals or carrying charges for irrigation water, miscellaneous sales of old material, etc., have produced an additional return of \$3,189,275.56. Reimbursement for work done for the Indian Service amounts to \$1,581,236.62. Under the respective laws authorizing these transactions this amount is credited as a reduction of the cost of the projects.

No new projects have been undertaken since 1906, but prior to that date 25 primary projects had been undertaken, the net investment in which on June 30, 1912, amounted to \$68,823,171.56, as shown in the following table.

Net investment in reclamation projects to June 30, 1912.

State.	Project.	Net investment.
Arizona.....	Salt River.....	\$9,641,595.53
Arizona-California.....	Yuma.....	5,765,285.71
California.....	Orland.....	554,871.74
Colorado.....	Grand Valley.....	101,415.11
Do.....	Uncompahgre.....	4,780,191.11
Idaho.....	Boise.....	6,958,350.90
Do.....	Minidoka.....	4,101,817.31
Kansas.....	Garden City.....	380,527.20
Montana.....	Huntley.....	886,958.50
Do.....	Milk River.....	1,004,309.63
Do.....	Sun River.....	863,581.50
Montana-North Dakota.....	Lower Yellowstone.....	3,041,709.27
Nebraska-Wyoming.....	North Platte.....	5,438,721.92
Nevada.....	Truckee-Carson.....	4,571,653.62
New Mexico.....	Carlsbad.....	692,154.57
Do.....	Hondo.....	353,962.44
New Mexico-Texas.....	Rio Grande.....	880,797.49
North Dakota.....	Pumping.....	873,896.11
Oregon.....	Umatilla.....	1,293,667.04
Oregon-California.....	Klamath.....	1,990,902.24
South Dakota.....	Bellefourche.....	3,083,149.11
Utah.....	Strawberry Valley.....	1,826,481.07
Washington.....	Okanogan.....	556,642.31
Do.....	Yakima.....	5,488,921.52
Wyoming.....	Shoshone.....	3,691,608.61
Total primary projects.....		68,823,171.56
Secondary projects.....		586,922.94
Arizona-California, Colorado River.....		43,708.23
Oklahoma, Cimarron.....		9,128.92
Oregon, Central Oregon.....		40,391.67
Townsite development.....		15,677.85
General.....		32,902.54
Indian:		
Blackfeet, Montana.....	\$143,503.64	
Flathead, Montana.....	152,625.36	
Fort Peck, Montana.....	10,113.22	
		306,242.22
Total.....		69,858,216.93

Included in the above are the expenditures on investigation of various so-called secondary projects or enterprises which have not been found to be such as to warrant immediate undertaking. There are also in addition certain investments in townsite development, \$15,677.85; in Indian irrigation, reimbursable, \$306,242.22; and for general expenses, not distributed on June 30, 1912, \$32,902.54; making a total of \$354,822.61.

Every effort has been directed toward the completion of those projects or portions of projects where the most immediate results can be had in the way of irrigable area. There are numerous requests for the survey of secondary projects which must be denied primarily because of lack of money to undertake them even if they should be found worthy.

The following table contains a summary of the results of the work from the time of the passage of the act of June 17, 1902, to June 30, 1912:

Summary of results to June 30, 1912.

Estimated area of all projects when completed.....	acres.....	3,020,689
Area for which the service is prepared to supply water.....	do.....	1,168,530
Area receiving water under permanent water right contracts.....	do.....	452,132
Area receiving water under temporary rental contracts, etc.....	do.....	383,572
Total area under contract for irrigation, 1912.....	do.....	835,704
Reservoir capacity.....	acre-feet.....	4,833,070

Canals built:

Capacity over 800 second-feet.....	miles.....	810
Capacity 301 to 800 second-feet.....	do.....	454
Capacity 50 to 300 second-feet.....	do.....	1,083
Canals and drainage ditches built, capacity less than 50 second-feet.....	miles.....	5,507

7,354

Number of tunnels built, 72; length, 113,534 feet.....do.....21.5

Storage dams built, volume 7,795,346 cubic yards.

Diversion dams built, volume 912,961 cubic yards.

Dikes built, volume 3,553,000 cubic yards, 80 miles.

Canal structures built costing—

Over \$2,000.....	568
\$500 to \$2,000.....	1,142
Less than \$500.....	33,398

Total.....85,108

Bridges built: Number, 2,908; length, 61,300 feet.

Buildings erected: Offices, 70; residences, 379; others, 346; total, 786.

Roads: Miles constructed, 659; railroads built, 44 miles.

Telephone lines: Miles constructed, 2,118; phones in use, 838.

Transmission lines: Constructed, 311 miles.

Material excavated: Class I, 79,790,814 cubic yards; Class II, 6,037,065; Class III, 4,846,402; total, 90,674,381.

Riprap: 377,407 cubic yards; paving, 439,940 square yards.

Cement used: 1,389,555 barrels; concrete in place, 1,157,507 cubic yards.

Cement manufactured by United States: 338,452 barrels.

Pipe laid: Concrete, 395,553 feet; tile, 35,733 feet; steel and iron, 28,483; wood, 171,017; total, 630,786=120 miles.

Flumes built: Concrete, 2,424 feet; steel, 59,207 feet; wood, 303,848 feet; total, 365,479 feet=69 miles.

The crop returns have been estimated and the following table gives the best information available concerning these:

Operation and maintenance results, 1909, 1910, and 1911.

	1909 20 projects.	1910 22 projects.	1911 23 projects.
Area irrigated:			
Under water-right applications.....acres..	176,942	206,318	270,459
Under rental contracts, etc.....do.....	233,686	265,105	297,937
Total irrigated.....do.....	410,628	473,423	568,396
Total number acres irrigable.....do.....	730,601	917,761	1,015,494
Number of farms irrigated.....	9,503	11,676	13,708
Number of water-right applications.....	3,657	5,325	9,528
Number of miles of canals operated.....	2,993	3,945	4,853
Cost of operation and maintenance:			
Total.....	\$936,433	\$981,966	\$1,058,238
Per acre.....	\$2.28	\$2.07	\$1.88
Value of crops:			
Total.....	\$11,920,663	\$12,974,639	\$13,121,224
Per acre.....	\$29.10	\$27.50	\$23.30
Population of farms.....	53,812	63,149	69,638
Quantity of water diverted to land:			
Acre-feet.....	1,523,638	1,665,696	2,079,083
Per acre.....	3.7	3.5	3.7

Public Resolution No. 56, approved August 24, 1912, provides for payment from the reclamation fund, to the extent of \$42,000, of claims for labor, supplies, materials, or cash furnished to the contractor or subcontractor and used in the construction of the Corbett Tunnel, a part of the works constructed for the Shoshone reclamation project. The time fixed by the Department for the presentation of such claims expired November 4, 1912, and the verification of them for certification to the Secretary of the Treasury, as required by the resolution, is now being made. The amount appropriated by Congress will be insufficient to pay all claims in full.

BUREAU OF MINES.

The general purpose of the Bureau of Mines is to conduct, in behalf of the public welfare, fundamental inquiries and investigations concerning the mining industry. The two phases of the industry that are of greatest national importance are safety and efficiency—safeguarding the lives of the miners and insuring the most efficient development and use of our mineral resources. Hence, the function of the bureau may be defined as the conducting of inquiries and investigations that have for their purpose the improvement of health conditions and the increase of safety, efficiency, and economic development in the mining, quarrying, metallurgical, and miscellaneous mineral industries of the country.

The act of Congress (36 Stat., 369) that established the bureau not only outlined the bureau's duties but transferred to it from the Geological Survey the work of analyzing and testing coals, lignites, and other mineral fuel substances, and of investigating the causes of and the means of preventing mine explosions.

The investigations conducted by the Bureau during the past year have been confined mainly to two groups: The study of fuels belonging to or used by the Government, and inquiry into the causes of accidents in mines and the most feasible means of preventing such accidents.

The first of these groups of investigations, for the conduct of which Congress made an appropriation of \$100,000, has had to do primarily with the purchase, for the use of the Government, of coal aggregating in cost about \$8,000,000; the most efficient methods of using this coal at the various heating, power, and lighting plants of the Government and on board government ships; and the safest and most efficient methods of storing coal for the Government at power plants, naval stations, and army posts. In the course of these investigations a large number of steaming tests were made with different coals and, in addition, more than 11,500 samples of coal were analyzed in the laboratories of the bureau. Investigations relating both to the efficient storage of coal and to the causes and prevention of spon-

taneous combustion of coal stored in bins or in the bunkers of ships were continued, in cooperation with the Navy Department, at the navy yards at Key West, Norfolk, and Portsmouth, and, in cooperation with the Panama Railroad Company, on the Isthmus of Panama.

In addition to these investigations of coal, the bureau has tested and analyzed a large number of samples of fuel oil in order to determine the suitability of the oils they represented for use as fuel on naval vessels or at government power plants.

The investigations into the causes and means of prevention of mine accidents were continued and extended during the year, but as yet have not progressed to the needs of the coal-mining industry. The causes of mine explosions and the means of limiting or preventing such explosions, methods of rendering safer the use of explosives and electricity in mines, and the reduction of risk from falls of roof, from mine fires, and from mine cars and locomotives were the more important matters investigated.

In carrying on these investigations the engineers of the bureau carried on laboratory experiments, examined coal mines in many States, and, at a small experimental mine near Pittsburgh, Pa., made tests to determine under working conditions how gas and dust explosions are caused and how such explosions may be limited or prevented.

In order to provide facilities for exploring mines immediately after disasters, while the mines are full of poisonous explosive gases, so that examination may be made while the evidence of a disaster is still fresh, the bureau maintains six safety stations; one each at Pittsburgh, Pennsylvania, Knoxville, Tennessee, Birmingham, Alabama, McAlester, Oklahoma, Urbana, Illinois, and Seattle, Washington, and operates seven mine-safety cars. These cars, equipped as far as practicable with mine-rescue and fire-fighting apparatus, have headquarters as follows: One each at Billings, Montana, Trinidad, Colorado, Evansville, Indiana, Huntington, West Virginia, Pittsburgh, Pennsylvania, Wilkes-Barre, Pennsylvania, and one at Rock Springs, Wyoming, and Salt Lake City, Utah. Each one of these cars moves from point to point, carrying a mining engineer and two experimental miners.

The progress made during the year toward greater safety in mining has been decidedly gratifying. The bureau continues to win the hearty cooperation of mine workers, mine owners, State mine inspectors, and manufacturers of explosives and mine equipment.

The growth of public sentiment in behalf of greater safety in mining and the voluntary efforts of miners and mine operators to improve conditions are evidenced in many ways. In coal mines black powder continues to give place to safer explosives; safety lamps and other safety appliances are being used more and more; improvements in electrical installations are being devised; mine explosions are being better understood and are becoming less frequent;

and more than 16,000 miners have received some training in rescue and first-aid methods.

For the continuance and extension of this work greater facilities should be provided. One more mine-safety car is needed for the metal-mining districts of Michigan, Minnesota, and Wisconsin, and the work of all the cars should be continued throughout the entire year. During the past fiscal year, on account of lack of funds, the training facilities of the cars and stations could be operated at only about 50 per cent of maximum effectiveness. The investigations looking to the prevention of accidents should be extended to include metal mines, quarries, and metallurgical plants. In the various branches of the mineral industry are 1,500,000 men associated with hazardous occupations, who need to be reached and enlisted in the movement for greater safety, and there should be no unnecessary delays in this. The statistical data concerning accidents in the mining, quarrying, and metallurgical industries have been far from complete in the past, and there have always been serious delays in their collection and publication. In many parts of the country no such statistics are collected, but the assembling of the data is essential to the formulation of intelligent plans for preventing mine accidents. There is, therefore, serious need that the Bureau of Mines be enabled to collect and publish statistical data with a degree of thoroughness commensurate with the importance of the subject.

The work of the bureau needs to be enlarged to include investigations into various branches of the mining industry, with a view to lessening the waste of essential mineral resources. In view of the present great losses in coal mining, and of waste in metal mining and metallurgical industries that ranges from 10 to 50 per cent of the total production, the value of such investigations would unquestionably prove beneficial to the whole country. In dealing with mineral resources, in contrast to rainfall, forests, or agricultural products, it should be understood that of mineral wealth the Nation has only one supply, which, when exhausted, it can not replace.

Attention is again called to the fact that the buildings and grounds at Pittsburgh now occupied by the Bureau of Mines for its investigations are inadequate for its needs, unsuited to its purposes, and are held subject to the wishes and needs of another department of the Government. This situation should be remedied in a manner commensurate with the importance of the work of the bureau.

OFFICE OF INDIAN AFFAIRS.

The functions which the Department of the Interior exercises with regard to Indian affairs are among the most important and at the same time the most difficult in the entire Government service.

The difficulties inherent in the problems themselves, considered without reference to outside influences and interferences, are exceedingly great. They are enormously enhanced by these outside influences and interferences. If the Indians now living in this country were located in a territory set apart for their exclusive use from which all white men not engaged in the performance of official duties connected with the Indians were absolutely excluded, and if all forms of trading by white men with Indians were strictly prohibited, the problems of administration would tax the wisdom and the executive ability of the most experienced and disinterested men. Even under such conditions, to care for the Indians and to fit them morally, intellectually, and industrially for future citizenship would be a task of huge proportions. Under the conditions which in fact prevail this task becomes tremendous. The Indian is not thus isolated; he can not be thus isolated. In spite of all disadvantages it is probably best for him that he should not be thus isolated. Nevertheless, the lack of isolation deprives him of much of the protection which its presence would afford. It exposes the Indian and the Indians' property to the cupidity of white men, which interferes on every hand and at every turn with the successful and efficient administration of Indian affairs.

The Indian lands which are still under varying degrees of governmental control through the Office of Indian Affairs, are valued at over half a billion dollars. This property is of every sort and character. It embraces agricultural lands suitable for cultivation by ordinary methods; lands which must be cultivated by means of irrigation; lands suitable for grazing; timber lands of all sorts; oil lands, gas lands, and asphalt lands; lands containing coal and other minerals, and water-power sites of great potential value. All of the great and perplexing problems of public policy which confront the Nation in the disposition and development of the public domain press for solution on the Indian Service. They are problems not merely of the future but of the present, for the Indian's property is being held not merely for future disposition, but is in large part being administered now so that it may produce the revenues for his support and education, and so that through its investment and use he may be taught and may be made a self-reliant and self-supporting member of the community. His timber is being sold and cut; his surplus grazing lands are being leased; his coal is being mined; his oil is being pumped; his fields are being irrigated and cultivated. As rapidly as he can be helped to develop the capacity for self-control and self-support his lands are allotted and his moneys are distributed. Meanwhile, those who have not yet demonstrated the capacity to protect and support themselves; those who adhere to primitive ideas and modes of life; those

who are yet in the early and transitory stages toward industrial civilization; and those whose appetites and desires make them the easy prey of the unscrupulous and the designing must be kept under wise and helpful supervision, and be furnished with such moral, intellectual, and industrial training as their circumstances permit.

The whole problem thus presented is one calling for business and executive ability of the highest order, coupled with sound and far-seeing views of public policy and a keen understanding of and deep sympathy with the sociological questions involved on the human side. It is important that the Nation and especially that Congress shall clearly understand the conditions under which the Department of the Interior is called upon to administer the affairs of its Indian wards. If all Indians were fully qualified to receive and to manage or control their appropriate shares, and if there were no other questions involved than those relating to the prompt and just distribution of adequate allotments among this number of persons, the task would be one of great importance and difficulty. When, however, among the persons interested in the property there are many minor children for whom some protection or guardianship would have to be provided, the difficulty of the task is immensely increased. When, in addition to this, many of the adults are unwilling or reluctant to receive their allotments of the property, when they are ignorant of or indifferent to its value and have no desire to assume the responsibilities of self-support under modern industrial or agricultural conditions and yet are likely to become pauperized and dependent upon the community if their property is lost or neglected, the seriousness of the problem is immediately increased. But even a problem such as is thus finally presented is simple compared with the problem which really faces the Indian Service. The human interests confided to its charge are of even greater complexity and difficulty than are the property interests, and the two are inextricably connected. We are attempting to adjust a primitive people to the conditions of modern industrial civilization, and we are doing this with all the difficulties inherent in the problem increased a thousandfold by the cupidity and greed of those who are waiting at every turn to acquire the Indian's property and to profit in every possible way by trafficking with him.

GENERAL ADMINISTRATION.

Even a superficial examination of the personnel and administrative methods of the Indian Service discloses the fact that its chief defect is in the absence of an adequate staff organization at the head of the service. The Commissioner of Indian Affairs receives a salary not at all commensurate with the qualifications which he should possess and the work he should perform, and if it be thought that the honor and authority of being at the head of this important service

to some extent make up this lack of money compensation, nothing of this sort can be said for the heads of divisions immediately below the commissioner in rank. It is only necessary to point out that the Commissioner of Indian Affairs receives a salary of \$5,000, the assistant commissioner a salary of \$3,500, that no other of the assistants or clerks on the statutory roll of the commissioner's office at Washington receives more than \$2,250 a year, and that the supervising force thus provided at the head of the service is absolutely unable effectively to direct and check the great mass of important work which must be performed by the field force. Transactions involving immense sums of money, property of enormous value, and principles of far-reaching consequence must be determined largely upon the recommendations of clerks who are paid from \$1,800 to \$2,250. It is surprising that the results are as good as they are upon the whole. It is not surprising that serious mistakes occur.

What the Indian Service imperatively needs is an increase in the number of first-class men in the responsible directing positions, and this can be obtained only by increasing the number and the compensation of such positions. An effective force at the head of the service might easily permit a substantial diminution in the lower clerical positions. If it did not permit such a decrease it would be solely because an improved clerical force of the present size is imperatively required for the proper conduct of the Indian administration. Under the present system it is most difficult to secure officials of the proper qualifications, and especially to retain in the service those who demonstrate that they possess such qualifications. Competent and ambitious men soon reach the limit of promotion and seek employment elsewhere. There are many excellent employees in the Indian Service, but it is nevertheless broadly true that under existing conditions the Indian Service does not attract the kind of men who are essential to its proper administration. The very fact that it is so difficult to obtain or keep men of the right sort has led to methods of administration which are not calculated to promote efficiency. This is especially true of the system of administering punishment and enforcing discipline by shifting men from one position to another rather than by discharging them from the service. The plea for leniency in punishing dereliction in such cases which comes up from the service again and again is based on the difficulty of filling positions. There are approximately 6,000 employees in the Indian field service, and the number of positions filled by resignations, transfers, etc., amount to over 4,000 in a single year. I have heretofore urged upon Congress such changes in the annual appropriations as will enable the Department to establish the policy which the considerations stated make desirable.

If we are to have this problem wisely and efficiently handled, some important changes must be made in the methods and organization of the Indian Office. The necessity for such changes was forcibly brought to my attention a year ago, and I should then have undertaken a thorough investigation for this purpose if conditions had permitted. At that time, however, the House Committee on Expenditures in the Department of the Interior had entered upon a series of hearings or investigations of the previous administration of the Indian Office. In the hope that this investigation would lead to definite suggestions with regard to the organization and future administration of the office and that some constructive report would be made during the past year, and desiring to avoid even the appearance of seeking to interfere with that investigation or to anticipate that report, I undertook no comprehensive inquiry of my own. My conclusions have been drawn from participation in and observation of the routine work of the Indian Office. I regret that the House Committee has made no report and that its investigations have been so largely devoted to specific complaints instigated by persons who have or think they have grievances against the Indian Office or its officials. Too many of these complaints have obviously been inspired by motives of resentment or of self-interest. It is important to unearth scandals and discover serious mistakes of judgment on the part of Indian officials, if such scandals or mistakes exist; but what is really needed is a comprehensive inquiry into the methods in vogue in Indian administration, the conditions under which it has been carried on, and the appropriate means to be employed for the improvement of these methods and conditions. The principal object of Indian administration is to bring the individual Indians as rapidly as possible to a condition where they can be self-supporting and self-reliant and to distribute their property to them as rapidly as this can be brought about, protecting them meanwhile from those who would ruthlessly despoil them of their property and of their moral and physical health for the sake of the ill-gotten gains to be thus derived. The Office of Indian Affairs can be much better organized and equipped for the accomplishment of this object.

REMOVAL OF RESTRICTIONS.

We wish to have the Indian become a self-supporting and self-reliant citizen as rapidly as possible, and in order to accomplish this the individual Indian must have placed upon his shoulders the very largest responsibility for the management of his own property and affairs that can be conferred upon him without overburdening his present powers or making him the prey of the unscrupulous. To

this end the policy of the Department has been to break up the pernicious system of individual rations and to make separate allotments of land to individual Indians as rapidly as possible. Nevertheless, to allot lands by wholesale or without reasonable precautions would lead only to disaster. The allottee must have some capacity and some desire to cultivate or appropriately utilize the land allotted to him. In many instances he has no such desire; in others he has not sufficient training.

During the past year instructions have been issued to utilize to the fullest extent that experience will justify the individual Indian's moneys which are now on deposit in the banks and amount to more than \$10,000,000. The general policy thus adopted was the discontinuance of monthly payments, except in cases of absolute necessity, and the free use of Indian funds by the fully competent Indians entitled to them, while less competent Indians were given increased privileges under official supervision. The superintendent was authorized to make requests covering the needs of individuals for an entire year instead of sending in numerous requests for individual expenditures. Issuance of these instructions has been followed by a deluge of requests (numbering about 125 daily) for authority to make payments amounting to a daily average of \$20,000. The work, however, is being handled promptly and is being given close attention with a view to its extension as rapidly as experience will justify. Similar principles are being applied in passing upon requests to permit Indians to make their own leases. It is apparent, however, that this policy has its wise and necessary limitations, for it can work only injury to many able-bodied adult Indians to permit them to rent their lands and to live in idleness upon the rentals.

EDUCATION AND TRAINING.

It is the constant effort of the Department to induce the Indians to become agriculturally and industrially self-supporting. Indian schools are increasingly conducted upon this principle. The enrollment in government schools for the fiscal year ended June 30, 1912, was 26,966, an increase of 3,000 pupils; and when the reports for the fiscal year 1912 have been compiled, it is thought that the total number of Indian pupils enrolled in public schools will exceed 14,000. The total monetary value of the Indian schools is estimated at \$12,000,000, and the annual government expenditure for education of Indian children is a little over \$4,000,000. It is, however, the established policy of the Department to turn over to local authorities the education of the Indians as rapidly as conditions will permit, and this has been largely accomplished in some localities. The conditions, however, will for some time continue to be such as to require the maintenance of many government schools for the educa-

tion of the Indians in localities where the common schools are not and can not now be made available.

Instruction of both minors and adults in practical agriculture is being given especial attention by increasing the number of experienced farmers doing house-to-house work among the Indians. This work has also been stimulated greatly through the encouragement of Indian fairs, by the establishment of Indian agricultural societies, and the holding of farmers' institutes on Indian reserves. More than 30 successful Indian fairs have been held this fall, and in every case reported the fair is said to have had a stimulating effect upon both the amount and quality of farming and stock raising done by Indians.

Reports with regard to the live-stock industry on the Navajo Reservation and upon some of the other reservations are encouraging. The agricultural progress in Oklahoma, the Dakotas, and Nebraska has been noteworthy. This has been accompanied by an increase of prosperity, a rise in the scale of civilization, and a marked decrease in drunkenness. Unfortunately, upon some reservations the old tribal or communal habits of the Indian and his consequent frequent repugnance toward industrial physical labor have retarded progress of this character. In other instances the lack of available funds to complete irrigation projects, to purchase agricultural implements, and to make necessary improvements has prevented the economic and social development of Indians who would otherwise have given excellent account of themselves.

TAXATION OF INDIAN LANDS.

The local white communities on or near Indian lands frequently have justifiable grounds for complaint in the fact that these lands are withheld from development and from taxation. This frequently encourages local sentiment which condones unfair or even illegal methods of separating the Indian from the ownership of such property, and while it furnishes a potent reason why the enforcement of Indian rights frequently can not safely be intrusted to local officials, it makes it all the more imperative that the Indian lands should be opened to general development and especially to local taxation as rapidly as practicable. In this connection it has been found that Indians who are competent to receive patents in fee often do not apply for these patents because they desire to avoid subjecting their lands to taxation until a sale has actually been made. The applications for patents have been found in most cases to be connected with contracts of sale already made. To cure this abuse steps are being taken to issue patents without request to Indians who should have applied for them. Instructions have recently been issued to superintendents to report all cases of competent Indians who should have patents in fee and have failed to apply for the same.

DETERMINATION OF HEIRSHIPS.

Substantial progress has been made in expediting the determining of Indian heirships and the issuance of farming and grazing leases; the number of Indians who have the privilege of leasing their lands free of departmental control having been more than doubled since the passage of the act of June 25, 1910. Copies of such leases, however, must be filed with the superintendent of the reservation and in the Indian Office as a check against fraud. Practical experience has justified a liberal policy in this matter, and the policy is to increase the number of Indians who are given the leasing privilege just as rapidly as is consistent with the conditions in each individual case.

SANITATION AND HEALTH.

The special investigation of the sanitary and health conditions among the Indians, the result of which was reported by you to Congress at its last session, sufficiently emphasizes the alarming need of increased appropriations and increased supervision of this work. This year's statistics show that out of 61,500 Indians examined, 8,394, or 13.6 per cent, were suffering from tuberculosis, while 9,254, or 15 per cent, were suffering from trachoma. Thirty-two per cent of the whole number of deaths reported from the various reservations were due to pulmonary tuberculosis as against 11.2 per cent of deaths due to this disease occurring in the registration area of the United States; this registration area includes 21 States, with a population of 51,690,975 white and 2,152,911 colored people. The death rate among Indians from all causes is estimated to be 30.24 per thousand, while the Census Bureau reports 15 per thousand as the death rate in the above registration area. A hospital is just being completed at the White Earth Reservation and others are in process of construction at Wahpeton, North Dakota, and Zuñi, New Mexico. In 1914 the Department needs at least \$155,000 for additional hospital facilities besides an appropriation of \$250,000 for the general sanitary and medical work. The Department is using its present resources for this important work to the fullest extent possible.

EMPLOYMENT OFFICE.

Systematic efforts are made to find employment for Indian students who are returning from the large boarding schools and for other unemployed Indians. The supervisor of employment has for several years had headquarters at Denver. It is especially important to have the educated Indian promptly and properly employed, both on his own account and as an example and stimulus to others. Substantial results have heretofore been accomplished in this direction, but much more can be done. The maintenance of the office of the supervisor

away from Washington has tended to unnecessary duplication of work in making reports and securing information, and the inspectors in the field have not been given as comprehensive a range of duties as they are capable of performing. This concentration of the responsible directing heads of the Indian work at the central office in Washington and the discontinuance of overspecialization in the work of the inspecting field force is being generally applied to the service in the belief that it will concentrate responsibility and increase efficiency.

ENFORCEMENT OF LIQUOR LAWS.

Constant difficulties are encountered with regard to the suppression of illegal sale of liquor to Indians, for which work an increase of \$50,000 for the fiscal year 1914 is being earnestly requested. There are now 11 special officers and 4 constables regularly employed, besides the chief special officer, 2 assistant chief special officers, and 184 deputies, employed as occasion requires. The attention of the Department having been called to the fact that absolute prohibition of the use of liquor has not heretofore been enforced among employees on Indian reservations, an order enforcing it has been issued. Heretofore efficiency in suppressing the Indian liquor traffic has apparently been estimated chiefly by the number of arrests and convictions made by the special employees. This led the special officers and employees to take action which was frequently ill considered. To prevent this, the control of the field force has been systematized, and the attention of all field employees among the Indians has been called to their direct responsibility in the matter of preventing the use of liquor by Indians, instead of leaving the liquor traffic to be prevented by prosecutions instituted by the special liquor officers and their deputies. The extent to which the liquor traffic is suppressed upon a particular reservation is to be made one of the principal items in determining the efficiency rating of the superintendent and regular employees of that reservation.

TIMBER LANDS.

The value of the timber resources on Indian lands is over \$80,000,000. This timber is of widely different character and situation. Its proper care and administration involves all the methods of timber conservation and disposal from the prevention of fire to the operation of the Menominee Indian mills, which made a net profit of about \$140,000 during the past year. On the Klamath Reservation applications have been received for the purchase of timber amounting to 400,000,000 feet, of which 1,500,000 feet have been sold at \$3.25 per thousand, and an additional 10,000,000 feet are being advertised for sale at this price as a minimum. On other reservations sales are under consideration or sawmills are under construction.

IRRIGATION WORKS.

The irrigation work now in progress under the Indian Service is of itself of such magnitude as to be worthy of a more detailed treatment than is at all possible within the necessary limitations of this report. The Indian appropriation act for the fiscal year 1913 provides for the following expenditures in connection with the irrigation of lands on various Indian reservations:

Appropriations for irrigation work on Indian reservations, fiscal year 1913.

Fort Mojave Reservation, Arizona.....	\$25,000.00
Colorado River Reservation, Arizona.....	35,000.00
Nomadic Papagoes, Arizona.....	5,000.00
Papago Reservation, Arizona.....	5,000.00
Ganado irrigation project, Arizona.....	35,000.00
Fort Hall project, Idaho.....	20,000.00
Fort Belknap, Montana.....	15,000.00
Klamath Reservation, Oregon.....	50,000.00
Uintah Reservation, Utah.....	75,000.00
Yakima Reservation, Washington.....	15,000.00
Wind River Reservation, Wyoming.....	75,000.00
Pierre School, South Dakota.....	4,000.00
General fund, irrigation Indian reservations.....	335,700.00
Work under construction by the United States Reclamation Service	
in cooperation with the Commissioner of Indian Affairs:	
Gila River Reservation, Arizona.....	15,000.00
Yuma allotments, California.....	52,362.62
Flathead Reservation, Montana.....	200,000.00
Blackfeet Reservation, Montana.....	100,000.00
Fort Peck Reservation, Montana.....	100,000.00

In addition to the appropriations above noted, a considerable sum is being expended each year from tribal funds in the maintenance, operation, and extension of the irrigation systems on the Crow Reservation, Montana.

Of the above-mentioned projects noted as under the Indian irrigation service, the Fort Mojave and Ganado are new projects; Colorado River, Yakima, and Klamath are partially completed, and five of the most extensive and important projects, viz, Fort Hall, Uintah, Wind River, Fort Belknap, and Crow projects, are practically completed, and irrigation work on these reservations is now simply a matter of maintaining and operating the existing systems, and of seeing that they are beneficially utilized, with extensions of the sub-lateral systems when necessary to cover such additional lands as may be subsequently brought under cultivation.

It is of the utmost importance that active measures be taken to put as large an acreage of the Indian lands as possible under cultivation within the next few years, to the end that the Indian water rights may be protected without litigation arising from failure to

comply with the provisions of the irrigation laws of the various States relative to the time limit for making beneficial use of the water appropriated.

In addition to the necessary apportionment in connection with the general supervision of all irrigation work performed upon Indian reservations, the general irrigation fund has been mainly apportioned to irrigation construction, maintenance, miscellaneous investigations, etc., in connection with various Indian reservations in Arizona, California, and New Mexico, where the Indians have no tribal resources, which could be utilized for irrigation work, as follows:

Papago Reservation, Arizona.
Salt River Reservation, Arizona.
Camp McDowell Reservation, Arizona.
Navajo and Moqui Reservations, Arizona and New Mexico.
Capitan Grande Reservation, California.
Cahuilla Reservation, California.
Morongo Reservation, California.
Pala Reservation, California.
Rincon Reservation, California.
Soboba Reservation, California.
Santa Rosa Reservation, California.
Zuni Reservation, New Mexico.
Pueblo Reservations, New Mexico.

More or less irrigation work is being performed on all the above reservations, and in nearly all cases the work is of a permanent character, and should be carried forward to completion at an early date. In the past the representatives of the Indian irrigation service have had charge of the maintenance of ditches after the projects have been completed. I believe better administration will be promoted by having the maintenance of a given project turned over to the superintendent in charge of the reservation immediately upon completion of the project, competent engineers, of course, being employed under such superintendent to construct necessary laterals to reclaim specific allotments.

GRAZING LEASES.

On September 1, 1912, joint regulations of the General Land Office and the Indian Office were made effective to cover approximately 6,000,000 acres of ceded Indian land. These regulations were the result of a decision by the Department in November, 1911, to the effect that Indian lands opened for settlement were to be held for the Indians until settled or sold and that the Indians were entitled to the use, or proceeds of any use, thereof. Grazing permits have already been issued to cover a large part of this territory at a minimum rate of \$1 per head for cattle and 20 cents for sheep. This arrangement, it is believed, will result in much better control of the grazing conditions

on these lands, besides giving substantial returns to be used for the benefit of the Indian tribes interested.

OIL LEASES.

Many of the Indian lands contain valuable deposits of oil. These deposits are not confined to the Five Civilized Tribes but occur in the Osage country and in other Indian lands in Oklahoma as well as in some of the Wyoming reservations. In general the development of these properties is beyond the financial capacity of the Indians themselves, and Congress has not authorized the Department to attempt direct development, but has given it some measure of control over the making of leases either by individual Indians in case of allotted lands or by the tribes in case either the land or the oil is tribal property. The exercise of this control involves many difficult business problems as well as some questions of governmental policy of great importance. Considerable progress has been made in this regard, both in getting the best return possible for the Indians and in handling the leases in such manner as not to run counter to general policies of the Government.

INDIAN SUPPLIES.

The purchase and distribution of supplies for the Indian Service are being systematized and improved, especially by the adoption of standard specifications and the revision of the proposal blanks, as well as by the prompt payment of supply claims through the disbursing officer of the Department of the Interior. The Indian Office reports that during the present fiscal year every claim presented has been examined and a check issued within 20 days after the claim has reached the office. Formerly payments were frequently delayed from 60 days to 6 months after the goods had been delivered to the warehouse. Prompt payment is expected to increase competition and to lower prices. Other improved methods of handling Indian supplies are being developed. The total amount expended for such supplies during the past fiscal year was \$3,082,639.47, of which over \$1,225,000 was expended through the five Indian warehouses. The total number of shipments made through the warehouses was 221,656; the total weight of such shipments was 49,857,085 pounds; and the total cost of warehouse maintenance was \$55,751.67.

TRADERS' CLAIMS.

As illustrative of past and present administrative conditions in the Indian Service, about 80,000 traders' claims against Indians were filed in the Indian Office during 1910 and 1911 from 60 superintendencies. These claims are held by some 2,500 creditors and

amount to more than \$1,700,000. The office has been involved in immense correspondence on account of these claims, the continuance or repetition of which it seeks to avoid by paying those claims that are rightly due from Indians who have individual funds to their credit, and compelling traders to confine their future traffic with the Indians to a cash or authorized credit basis. Just claims against Indians who have no individual funds must be taken up for future disposition upon some basis which Congress may authorize.

RELIGIOUS WORK AMONG THE INDIANS.

One of the most difficult and yet one of the most important duties of the Indian Office is to determine the conditions under which the observance and teaching of religion shall be conducted among or by the Indians. The taking over by the Government of Indian schools previously established and conducted by religious organizations has greatly complicated the situation. During the past year a serious controversy arose out of the fact that 51 out of approximately 2,000 teachers and employees in Indian schools continued to wear the distinctive garb of the religious orders to which they belonged. By your direction a full hearing was given all the parties in interest, and the conclusions which were reached after much deliberation were fully stated in a letter of instructions from the Secretary of the Interior to the Commissioner of Indian Affairs, dated August 24, 1912, which letter was approved by you. I believe that the complete discussion contained in this letter and in your statement of approval is necessary to convey a proper understanding of the issues involved and of the decision reached. Printed copies of the letter of instruction can be obtained by those who desire them. Copies have been distributed in the Indian Office for the guidance of administrative officials having to do with this and similar questions.

FIVE CIVILIZED TRIBES.

TRIBAL AFFAIRS.

The work of allotting lands to over 101,000 citizens is practically completed, although there remains considerable work in connection therewith, such as the preparation and delivery of certain allotment deeds and equalization of allotments. Rapid progress is now being made in disposing of remaining tribal lands and property and winding up tribal affairs.

Allotments to Seminoles have been completed. Of the surplus unallotted lands 3,543 acres have been sold for \$37,285.37 on deferred payments. There remain a few tracts, aggregating 160 acres, which will be sold in the near future. Allotment deeds have been prepared and are being delivered, except in specific cases where con-

veyances have been obtained from the Indians fraudulently or for inadequate consideration. There are two tribal boarding schools with 320 acres of land each, the Seminole agreement providing for their continuance by tribal moneys set aside as a permanent school fund for the education of the members of said tribe; only one of these schools has been maintained during the past year.

Allotments have been made to all Creeks. Of the unallotted lands 62,167 acres have been sold for \$378,197 on deferred payments. The remaining unallotted lands, aggregating 1,553 acres, will be sold in a short time. There are 17,708 Creek citizens having amounts due them averaging \$370 each, aggregating approximately \$6,900,000, to equalize their allotments on a basis of \$1,040 each, as provided by the agreement. These amounts can not be paid, as the total of the Creek tribal funds is only about \$3,400,000. By the act of Congress approved March 3, 1909, provision was made for the equalization of Creek allotments upon a basis of \$800, with a condition precedent, however, that the Creek National Council should pass an act in form approved by the Secretary of the Interior, discharging the United States from any further claim on this account. The Creek Council rejected this proposition. Therefore, the matter of equalizing these allotments remains unsettled pending further action by Congress. Four tribal boarding schools with 40 acres of land each are now being maintained. There are also 219 town lots remaining unsold.

The completion of allotments to Cherokees has been delayed by litigation affecting allotments of certain minors and a certain class of freedmen. This litigation has recently been determined by decisions of the United States Supreme Court, holding that the minors were entitled to allotments and that certain freedmen were not. Final allotments have been made and deeds prepared during the year are now being delivered to 4,400 of the 5,605 minor citizens affected, and allotments affected by the decision in the freedmen case are being adjusted. The payment of about \$892,000 to 1,205 minors, receiving no allotments, and others having various amounts due them owing to exhaustion of land, is now in progress. There remain about 625 acres of land, together with 15 town lots, to be disposed of. There are also 272 rural cemeteries of from 1 to 3 acres each. One tribal boarding school, together with 40 acres of land, is still maintained from tribal funds. All other remaining unallotted lands, aggregating 49,765 acres, have been sold for \$179,828, final payments on which are due in November and December, 1912.

Allotments to the Choctaws and Chickasaws have been completed, with the exception of several cases involved in litigation. There have been sold at auction 834,071 acres of the unallotted lands of these nations for \$5,655,501, final payments on last sale being due in January and February, 1914. There remained on July 1, 1912, approxi-

mately 2,621,200 acres, including 432,585 acres of segregated coal and asphalt lands and almost 1,300,000 acres of the so-called timber reserve to be disposed of; 817,000 acres of the unallotted lands, together with 10,800 acres of timber land, have been advertised to be offered for sale in November and December, 1912. In addition thereto there are the reserved coal and asphalt deposits; 101 cemeteries, containing from 1 to 20 acres each, aggregating 600 acres; 2,194 town lots; 6 tribal schools, with 160 acres of land each, which are now maintained with tribal funds; 2 boarding schools, with 160 acres of land each, not now used, and the Choctaw capitol building, with 5 acres, all of which are still tribal property.

It has been found impossible properly to complete the survey and appraisal of the surface of the segregated coal and asphalt lands within the time allowed by the provisions of the act of Congress of February 19, 1912, as subsequently amended. It therefore seems advisable for Congress immediately to enact legislation extending the time for the appraisal, and also providing that the appraised lands may be offered for sale as they are appraised from time to time, such offerings to be made in large enough amounts at one time to arouse interest in prospective bidders.

There has been paid to equalize allotments of 61,974 allottees of the Choctaws, Chickasaws, and Cherokees \$520,852, leaving 11,118 citizens having small amounts still unpaid.

The aggregate of the unallotted lands sold in the Five Tribes amounts to 16,421 separate tracts containing 949,547 acres, the total price being \$6,250,811, of which, at the close of the last fiscal year, \$3,420,308 had been paid in and was almost all on deposit in various State and National banks in Oklahoma, earning interest at rates varying from 4½ to 6 per cent. The remainder of said purchase price consisted of deferred payments which bear 6 per cent interest.

It has been found, so far, impossible to dispose of the so-called timber reserve in the Choctaw Nation. Although this land has been offered for sale under existing law, yet, doubtless due to the fact that the merchantable timber is very sparse and scattering, averaging less than 1,000 feet to the acre, the bids received have in general been less than the appraised value. There have been some discoveries of manganese ore on parts of these lands, the extent and value of which is still under investigation. So much difference of opinion, especially among the Indians interested, has arisen as to the proper method of disposing of these lands that I deem it proper to call the situation to the attention of Congress, with a view to possible legislation.

The income derived as royalty from the coal and asphalt leases in the Choctaw and Chickasaw Nations amounted to \$252,924.97 in the past fiscal year, and the present prospects are that this income will increase in the near future.

In compliance with the provisions of the various agreements, all expenses incident to the work of enrollment, classification, and appraisal of the lands and allotments to individual members from the creation of the "Dawes Commission" in 1893 to June 30, 1912, have been paid by the Government at an average cost per capita of persons allotted of \$34.99. No provision was made in any of the agreements with reference to the expense of disposing of lands after allotment; therefore Congress, by act of March 3, 1911, provided that such expenses should be paid from proceeds of sale. The expense of the tribes in connection with the sales of lands to June 30, 1912, amounted to \$39,420.90, or an average cost of about 4 cents per acre.

Before tribal affairs can be finally settled legislation will be required with reference to the final disposition of the coal and asphalt mineral, together with tracts reserved for cemeteries. It is also desirable that Congress authorize payments from time to time to enrolled members of accumulated proceeds from sale of unallotted lands and other tribal property, together with the setting aside of specific amounts from tribal funds for the maintenance of tribal boarding schools for such period as their continuance may be thought advisable.

INDIVIDUAL AFFAIRS.

The work of the Union Agency, including the field force attached thereto, is almost entirely among the individual Indians. This individual work has no bearing one way or the other upon the closing or prolonging of tribal affairs.

The territory of the Five Civilized Tribes embraces the eastern half of the State of Oklahoma, originally Indian Territory, and includes 40 counties.

The greater portion—approximately 16,000,000 acres—of the land in this area was allotted to the 101,239 enrolled members of the Five Tribes. The allottees reside in every section of this area, so that each county has its share of Indian population. In order economically and satisfactorily to conduct the business coming before the Department, a field force has been distributed at convenient points, thus enabling the Indians and the public having dealings with them to transact their business before a local officer, and the Department to secure first-hand information from men familiar with local conditions. With the large territory to be covered and the scattered Indian population, if all of the information with respect to the thousands of complicated lease and land matters acted upon each year were secured by sending men from the Union Agency office at Muskogee, the work would not only stagnate but the expense would be almost prohibitive.

It has become the custom to compare all of the Indians of the Five Tribes with the highly educated business or professional man who is Indian only in name. Except that he wears white men's clothes and lives in a log or frame house instead of in a tepee, there is little difference between many full bloods of the Five Tribes and the full bloods of the western reservations. Thousands of them live in a rough, mountainous country, many miles from a railroad, and have no knowledge whatever of business transactions. They need not only every reasonable protection in their property rights but advancement along industrial and general educational lines and a more healthful mode of living. Some of the full-blood Indians in the Five Tribes have absolutely refused to recognize present conditions of abolishment of the old communal tribal property and the substitution of individual property therefor. There are, for instance, nearly 2,000 Cherokees alone who have refused to accept their allotment deeds or take possession of their land, but have withdrawn themselves as far as possible from the well-settled portions of Oklahoma, and are living in the rougher parts of the country as nearly as they find it possible in the manner that their ancestors lived. Many of these Indians will not send their children to school. As the citizenship rolls of the tribe have been closed and no children born subsequent to March 4, 1906, are recognized as members of any tribe or entitled, except as they may inherit property, to any lands or money, there is growing up a class of full-blood Indians who are likely to become illiterate charges on the community unless adequate provision is made for them.

It is estimated that the value of real estate belonging to minor Indians in the Five Civilized Tribes will exceed \$150,000,000. Part of this is inherited land, but a large part of it comes from the fact that minors were allotted equally with adults when the allotments were originally made and that most of those minors are not yet of age. This vast amount of property occasions naturally a very large amount of guardianship business which is handled by the probate judges in Oklahoma. There is one judge to each county, and he has certain ordinary civil and criminal jurisdiction so that all his time can not be given to probate work. In consequence the field force of the Union Agency has accomplished a great deal in looking after the interests of the minors. A great majority of the probate judges have commended this work and asked for the continued assistance and cooperation of this force.

The Union Agency has handled up to the close of the past fiscal year many thousands of oil and gas leases on account of individual members of the Five Civilized Tribes, mostly Creek and Cherokee. On June 30, 1912, there were carried on the books very nearly 9,000 accounts of individual Indians with balances aggregating \$1,135,033.24. This money was deposited in banks and was earning interest during

the period before its use by or for the benefit of the Indians. Including amounts received from the Treasury for transfer to individual accounts or disbursement, the Union Agency handled \$10,701,624.27 during the fiscal year 1912.

Recent decisions of the United States Supreme Court involving conveyances of Indian lands have paved the way for the disposition of a large number of the more than 20,000 suits to set aside illegal conveyances. Some 6,284 of these suits have been dismissed or adjusted. Many others could without doubt be settled if the necessary legislation were enacted to permit adjustments along lines that would do substantial justice to the Indians, which would go a long way toward the straightening out of title conditions in eastern Oklahoma. The Department has made reports to Congress upon different bills seeking to accomplish this end and pointed out the way that it believes these results may be secured and the desirability for such action.

EXPENDITURES.

The total expenditures for all purposes on account of the Five Civilized Tribes during the year from congressional appropriations for administrative purposes were \$311,638.98, of which \$34,578.18 was used in connection with tribal matters and \$277,060.80 for supervising affairs of approximately 35,000 restricted Indians, an average cost of \$7.91 per capita, including the district agency service, which is much less than expended for other Indians. Sixteen thousand two hundred and ninety-five dollars and thirteen cents was received as fees and used in the preparation of certified copies of records. There were expended from tribal funds the following amounts: \$86,992.63 for expenses in connection with the sale of unallotted lands and collection of tribal revenues, the proceeds of which amounted to \$1,782,876.08; \$90,884.23 in payment of salaries and expenses of tribal attorneys under contracts approved by the President, and for tribal officers authorized by law; \$2,073,761.60 for various special purposes authorized by Congress, including \$2,007,670.68 to individual Indians as per capita and equalization payments. In addition thereto \$339,859.90 was expended for education. There was collected for and paid to individual Indians, or placed to credit of tribes, amounts aggregating \$6,172,594.55.

PENSION OFFICE.

At the beginning of the fiscal year ended June 30, 1912, there were 892,098 pensioners on the roll. There were added thereto during the year 23,311, made up of original allowances, restorations, and renewals. There were dropped therefrom 55,115, occasioned by death, remarriage, minors attaining the age of 16 years, failure to claim for three years, and all other causes, making a net reduction in

the roll of 31,804, and leaving the total number on the roll at the close of the year of all classes 860,294, of whom 538,000 were soldiers and sailors, 321,932 were widows and dependents, and 362 were Army nurses.

The unexpended balances of the appropriations at the close of the fiscal year covered into the Treasury were as follows:

Unexpended balances, Pension Office, fiscal year 1912.

For pensions	\$18, 204. 17
For medical examinations.....	20, 233. 00
For salaries and clerk hire, pension agencies.....	8, 349. 22
For rent and contingent expenses.....	2, 251. 39
For salaries, Bureau of Pensions.....	21, 706. 58
For salaries, per diem, and expenses of special examiners.....	2, 490. 33
Total	82, 333. 69

The amount expended for pensions during the year was \$152,986,433.72, a decrease as compared with the previous year of \$4,338,726.63. The cost of administration in connection with the adjudication of claims and the payment of pensions was \$2,448,857.31. This is a reduction in the running expenses of the bureau and agencies of \$68,269.75 as compared with the previous year and is the smallest amount paid for such administration in any one year for 30 years.

The amount due and unpaid at the close of the year on certificates issued during the fiscal year 1912 was \$514,631.36. The appropriation became exhausted a short time before the close of the year, but as all amounts remaining unpaid at the close of the year were paid as soon as the new appropriation became available on July 1, 1912, there was no deficiency created. The only embarrassment which resulted was a slight delay of a week or 10 days on the part of a small number of pensioners in the receipt of the pension due on new certificates issued toward the close of the year.

The appropriation for the fiscal year 1913 is \$164,500,000. It is estimated that the amount required for the fiscal year 1914 will be \$185,000,000, an increase of \$20,500,000 over the year 1913. This increase is due to the increase in rates carried by the act of May 11, 1912, providing increased rates on account of service during the War with Mexico and at certain ages on account of service during the Civil War.

There was disbursed for pensions from July 1, 1790, to June 30, 1865, \$96,445,444.23. From July 1, 1865, to June 30, 1912, the total disbursements for pensions have been \$4,286,922,719.65. The expenses and cost of maintenance for the same period were \$123,328,719.05, making a total of disbursements since July 1, 1865, of \$4,410,251,438.70.

There have been granted since 1861, by special acts of Congress, 39,472 pensions and increases of pensions, of which number 22,084 are now on the roll, calling for the payment of \$6,584,572 annually. Only a part of this amount, however, is properly chargeable to special acts, as most of the beneficiaries had been previously pensioned under the general laws at lower rates. Up to and including June 30, 1912, during the second session of the Sixty-second Congress, 3,485 persons were pensioned by special acts.

The largest number of pensioners on the roll at the close of any fiscal year was June 30, 1902, when the total number was 999,446. There has been a decrease of 139,152 in the number of pensioners since that date and the number is now less than at any time since 1891.

The recommendations made by the Commissioner of Pensions in his annual report for the fiscal year ended June 30, 1911, were enacted into law and are contained in the act approved August 17, 1912. That act provides for the abolishment of the pension agencies from and after January 31, 1913, and for the payment of pensions after that date by a disbursing clerk in the Bureau of Pensions. It is expected that after the establishment of the system of paying pensions without vouchers and the payment thereof by a disbursing clerk in the Bureau of Pensions there will be a reduction in the cost of administration amounting to about \$250,000 per annum. The first payment of pensions by the disbursing clerk in the Bureau of Pensions will be made for the quarter ending February 4, 1913, and it is expected that all checks for pensioners whose quarterly payments become due on that date will be ready for mailing on the morning of February 4, 1913. In this act it is provided that pensions, with certain exceptions, shall be paid by checks without separate vouchers.

At the close of the year the number of pending applications of all kinds was 422,464 as against 36,793 pending at the beginning of the year. The increase is due to the large number of claims filed under the act of Congress approved May 11, 1912, which grants pensions according to the length of service to persons who served 90 days or more in the military or naval service of the United States during the Civil War and were honorably discharged, who have reached certain ages, at rates as indicated in the following table:

Rates under act of May 11, 1912.

Age.	Length of service.						
	90 days.	6 months.	1 year.	1½ years.	2 years.	2½ years.	3 years.
62 years.....	\$13.00	\$13.50	\$14.00	\$14.50	\$15.00	\$15.50	\$16.00
65 years.....	15.00	15.50	16.00	16.50	17.00	18.00	19.00
70 years.....	18.00	19.00	20.00	21.50	23.00	24.00	25.00
75 years.....	21.00	22.50	24.00	27.00	30.00	30.00	30.00

It also grants pensions at the maximum rate, \$30 per month, without regard to age or length of service, to persons who served in the military or naval service during the Civil War and received honorable discharges and who were wounded in battle or in line of duty and are now unfit for manual labor by reason thereof or who from disease or other causes incurred in line of duty resulting in their disabilities are now unable to perform manual labor. It also provides a rate of \$30 per month for surviving soldiers and sailors of the Mexican War who served 60 days or more and were honorably discharged.

The Commissioner of Pensions reports that between the approval of this act and the close of the fiscal year 466,048 applications for pension were filed thereunder, and that before the end of the year 13,404 certificates had been issued under said act.

The total number of applications filed during the year was 508,812; and during the year 116,868 claims were adjudicated, of which 91,120 were admitted, 24,925 rejected, and 623 approved in which no certificates were issued because they would not have benefited the applicants.

Allowances of accrued pension were made in 19,493 cases, being issues for payment in case of deceased pensioners from the date of last payment to the date of death.

Since the passage of the act of March 8, 1899, providing for a division of pension of resident pensioners of the United States who shall desert their wives or minor children or who are inmates of National or State soldiers' or sailors' homes, 14,021 claims have been filed thereunder, 7,675 of which have been allowed and 6,182 rejected, leaving 164 pending.

During the year 5 original bounty-land warrants were issued, granting 720 acres of land. The total number of such warrants issued to the close of the fiscal year 1912 was 598,690, granting 68,792,270 acres.

At the beginning of the year there were 1,427 claims for reimbursement of the expenses of the last sickness and burial of deceased pensioners pending; 7,605 such claims were received during the year, and 123 which had been disallowed were reopened, making a total of 9,155. Of these, 6,005 were allowed, 1,126 disallowed, and 814 abandoned, leaving 1,220 pending.

There were 77 cases presented to the Department of Justice for prosecution on account of offenses against the pension laws, and indictments were found in 40 cases. There were 35 cases brought to trial during the year, in 34 of which convictions were secured—only 2 of these having been cases against persons who had rendered military or naval service. At the close of the year 116 cases were pending in the hands of United States attorneys. One civil suit was

instituted and 1 dismissed, and 4 were pending at the close of the year.

The sum of \$3,448.04 was recovered through refundments.

As a matter of historical interest it is noted that the last surviving soldier of the Revolutionary War died April 5, 1869, and the last widow of a soldier of that war died November 11, 1906. The last surviving pensioned soldier of the War of 1812 died in 1905. There are now 238 widows of soldiers of that war on the roll.

APPEALS IN PENSION AND BOUNTY LAND CLAIMS.

On July 1, 1911, the Board of Pension Appeals, composed of eight lawyers and medical men, whose function it was to pass upon all cases brought to the Secretary's attention by appeal from the action of the Commissioner of Pensions, went out of existence and the work devolved upon the office of the Assistant Attorney General of the Department, under the provision of the act of Congress abolishing the board. That act provided for the appointment of two additional assistant attorneys and a medical expert. It was immediately found that three men could not handle the volume of work thus transferred to the office. It was necessary to appoint the remaining five of the former members of the board to other and subordinate positions in the Department and to detail them immediately to the office of the Assistant Attorney General for duty in connection with these appeals. The service required of them has been precisely that rendered when they were members of the former board, but the compensation is necessarily very much lower.

The abolition of the board was effected in the belief that the appeals in pension cases would be materially reduced. The event does not justify the expectation. The statistics concerning pension appeals are incorporated in the report herein as to the Assistant Attorney General's office. The fact that since the act of May 11, 1912, has been in operation the number of appeals has increased is mentioned in the estimates for appropriations for the work of the Department, and the Department has advised the reestablishment of the board.

Pension appeals are by no means confined to cases arising from service during the Civil War. A very large and increasing percentage relate to service during the War with Spain and in the regular establishment. In respect to the Civil War, the recent act (May 11, 1912), granting pensions not only on a basis of age but upon length of service has presented many new and difficult problems—questions of law, military and civil, as well as of fact.

On September 1, 1911, new rules governing appeals were put in operation. Appeals from that date have been filed in the Pension Bureau instead of in the office of the Secretary. The Commissioner

of Pensions is accorded 30 days in each appealed case to review his action, with the opportunity to recede therefrom. Since that date only those cases in which the commissioner insists that the merits warrant no reversal of his action have been transmitted to this office for final adjudication. One purpose has been effected—the number of merit appeals requiring the consideration of the pension-appeals section of the Assistant Attorney General's office has been materially reduced. About 18 per cent of the appeals filed have been disposed of in the Pension Bureau; between 3 and 4 per cent being dismissed for material defects, and the contentions of the appellants in 15 per cent being satisfied by the voluntary recession of the Commissioner of Pensions from his adverse action. The recorded number of appeals as given in the report of the Assistant Attorney General is therefore (by 18 per cent) less than the actual number of appeals; and of those appeals ultimately disposed of in my office the action of the commissioner was reversed in 8 per cent of the cases. The net result of noting an appeal, therefore, has been favorable to the pension claimant in about 23 per cent of the cases.

The report of the Assistant Attorney General shows to what an extent his office is overwhelmed with work, which has greatly increased over former years.

The law permits appeals in pension cases; and the figures hereinbefore quoted—the percentage of reversals and recessions—seem to justify the law. Some means of disposition of the appeals must continue to be provided either by men adequately compensated in the Assistant Attorney General's office, or, as prior to July 1, 1911, by a board. As the reason for abolishing the board has not been sustained by any material reduction in the number of appeals noted, I recommend that the Assistant Attorney General's office be relieved of this work and that the former Board of Pension Appeals be reestablished.

THE PATENT OFFICE.

During the fiscal year ended June 30, 1912, there were received 69,286 applications for mechanical patents, 1,775 applications for designs, 195 applications for reissues, 7,238 applications for trade-marks, 941 applications for labels, and 362 applications for prints. There were 35,539 patents granted, including reissues and designs, and 4,635 trade-marks, 625 labels, and 268 prints were registered. The number of patents that expired was 19,634. The number of allowed applications which were by operation of law forfeited for nonpayment of final fees was 6,970. The total receipts of the office were \$2,094,059.50, the total expenditures were \$2,019,236.01, and the net surplus of receipts over expenditures was \$74,823.49. The grand total of net surplus receipts over all expenditures is now \$7,138,749.25.

These statistics show a material increase during the last fiscal year over the fiscal year ended June 30, 1911. The total number of applications for patents for inventions, for designs, for reissue of patents, registration of trade-marks, registration of labels and registration of prints, disclaimer to patents, and appeals on the merits is 81,459. The total of all applications for the fiscal year immediately previous was 76,383 for the same period, which shows an increase of 5,076 applications received. The number of applications for mechanical patents shows an increase of 4,082 over the previous fiscal year, or 6.26 per cent, and an increase of 40.72 per cent for the 10 years since 1903.

I heartily concur in the recommendations of the commissioner regarding the need for a new building for the United States Patent Office. The rapid growth of the bureau since the erection of the present building has necessitated the utilization of every available foot of space within the building for the needs of the working force and the storage of valuable documents and records. The model halls and the corridors alike have been turned into working and storage quarters, the models having been removed to the basement of the House Office Building, where they are practically inaccessible to the Patent Office. It is important to note that the storage of records in the hallways, where they are exposed to dust and the ravages of time, and the constant exposure to destruction by fire, places in jeopardy documents of immense value to the commercial interests of the country. It also makes the building unsightly, and the inconvenience in having copies of patents, which are needed daily, scattered over the building is considerable. The clerks are occupying cramped quarters, although it has been repeatedly shown that this overcrowding is insanitary and not in accordance with the rules of hygiene, which prescribe a certain amount of cubic air space for each individual. I have, therefore, again to call attention to the suggestions of the commissioner embodied in his report that for the immediate future a suitable building be leased for occupation by the Patent Office pending the construction of a permanent Patent Office building, so that the present building may be thoroughly renovated and remodeled for the use of the Department and those of its bureaus that are now in rented quarters. This would result in an economy of time and money and would greatly relieve the present situation, which is extremely unsatisfactory.

The commissioner recommends the introduction of a bill in the forthcoming session of Congress similar to a bill introduced in April of 1909 by the late Senator Daniel, of Virginia, which contemplated the condemnation and purchase of sufficient land opposite the Capitol and north of the Library of Congress upon which to erect the new Patent Office Building, and calls attention to the fact that the Patent

Office has heretofore earned the money that might be appropriated for that purpose.

The commissioner has recommended that legislation be enacted for the protection of collective trade-marks, in order to fulfill the terms of section 7 $\frac{1}{2}$ of the international convention for the protection of industrial property, signed at Washington, June 2, 1911, which convention has been approved by the United States Senate and will become effective on April 1, 1913. Under your direction the commissioner prepared a measure, which was recommended in your message to Congress under date of February 2, 1912. This measure, the draft of which conforms substantially in terms to the provisions of law upon this subject found in the British trade-mark act of 1905, does not appear to have been taken up for consideration by the Congress, and it is suggested that the attention of Congress be directed to the urgent need for this legislation.

BUREAU OF EDUCATION.

The Commissioner of Education during the year established two new divisions, to have charge of matters relating, respectively, to rural education and to school hygiene and sanitation, and was thereby enabled to extend very largely the field service of the bureau. Aid has been given to school boards and officers in many parts of the country in the location, planning, and construction of school buildings of all kinds, and a large amount of data regarding the health of school children has been compiled and furnished to inquirers.

The problems of rural education, which are very difficult and very important to our national life, are studied as fully as the limited means of the bureau will permit. Special collaborators in all sections of the country have been appointed at nominal salaries and are keeping the bureau informed as to the pressing problems and forward movements in rural education in their several communities. Several bulletins on this phase of education were issued during the year and have received wide circulation.

Forty of the colleges of agriculture and mechanic arts endowed by the Federal Government were visited during the year by a representative of the bureau, who made an inspection of the finances, organization, and administration of the institutions. Irregularities in the application of the Federal grants were discovered in several instances and steps taken for remedying them promptly. Each State and Territory now receives an annual appropriation of \$50,000 from the Federal Government for such institutions, and the total amount paid out by the Government for the institutions since 1890 is \$31,302,000.

At the request of the Department of Public Instruction of the State of Oregon, the colleges and universities in that State were ex-

amined by the bureau, and at the request of the Virginia Education Commission an examination was made of the institutions for higher education receiving aid from the State. In both cases detailed reports of the examinations were furnished to the States.

The furnishing of information to State and other education officers respecting educational legislation in all the States was continued during the year. The service of the bureau was largely extended by the issuance to the public through the educational and public press of information respecting important movements in education throughout the United States and in foreign countries.

There were issued during the year 32 numbers of the Bulletin of the Bureau of Education, for some of which the demand was very great. The limitation of 12,500 copies of any bulletin that may be issued by the bureau should, in my opinion, be removed.

In my report for 1911 (pp. 48-51) I called attention to the fact that certain pressing needs of the bureau must be supplied before it can begin to do in an effective way even the most important and obvious of the things for which it was established. While the population of the country has more than doubled since the bureau was established, the expenditures for education have increased sixfold, and the complexity of the problems of education have increased many fold. With a like increase in the demands made upon the Bureau of Education, the annual appropriations made for its support have increased from year to year only slightly or not at all. The excess of the estimates for its support over the amount appropriated for the current year may appear large, but it should be remembered that it is only a part of the sum of moderate increases that ought to have been made annually for the past 30 years. The commissioner recommends that provision be made for the following:

1. An Assistant Commissioner of Education, who should be a specialist in secondary education and serve as chief of the division of high schools. To keep in close touch with the work of education in all parts of the country, as he must if he is to do his work effectively and make the bureau the vital factor it should be in the educational life of the country, the commissioner must travel much. When in the office he should be relieved from minor details that he may have time for the larger and more important work of direction.

2. Additional specialists in rural education and in school hygiene and sanitation. The work this bureau should do in these subjects is much larger than can be done with its present staff and with the appropriations now made for these purposes.

3. A group of specialists and assistants in industrial and vocational education.

4. Additional specialists and assistants in higher education.

5. Specialists and assistants in the administration of city schools.

6. A specialist in the history, theory, and practice of education, who shall serve as a director of investigations, give assistance to other specialists in the bureau and to students of education, committees, and commissions who apply to the bureau for help in their investigations.

7. Cooperative experiments in elementary and secondary education under varying conditions in different parts of the country, the results of these investigations to be published for the information of the public.

8. Additional clerks to carry on the present routine work of the office and such additional work of this kind as may become necessary because of the larger work planned.

9. Traveling expenses sufficient to enable the commissioner and the specialists in the bureau to do their work effectively. The nature of the work of the bureau requires that the commissioner and the specialists in the bureau should travel in all parts of the country.

The commissioner also recommends that the limitations placed by section 3 of the act of Congress approved August 23, 1912, making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June 30, 1913 (37 Stat., 413), and by section 7 of the act of Congress approved August 26, 1912, making appropriations to supply deficiencies in appropriations (37 Stat., 626) on the amount of salaries that may be paid from lump-sum appropriations be removed so that the services of competent men and women may be obtained. The salaries in the Bureau of Education have always been low, and that bureau, he states, can never do effectively the most important work for which it was created until it can retain in its service men and women of learning, experience, working capacity, and expert knowledge such as will win for their opinions and utterances the respect of leaders in all lines of educational activity. Men and women of this character can not be retained at the salaries now paid.

The number of public schools for natives of Alaska that were maintained during the year was 86, with an enrollment of 4,018 and an average daily attendance of 1,805. The field force of the Alaska school service consisted of 5 superintendents, 110 teachers, 7 physicians, 7 nurses, 2 contract physicians, and 2 hospital attendants.

Of the appropriation for education in Alaska, \$24,926.04 was expended for the medical relief of natives. In order that the entire medical work among the natives of Alaska might have expert supervision, upon the request of this Department Passed Asst. Surg. Emil Krulish, of the Public Health Service, was detailed for duty in Alaska under the direction of the Commissioner of Education.

Adequate provision for the medical relief of the natives of Alaska is an urgent national duty, and liberal appropriations therefor should be made. The use of part of the appropriation for "Educa-

tion of natives of Alaska" for the suppression of disease among the natives is an emergency measure. All of the appropriation and more is needed for the work of education. That results in education commensurate with expenditures may be obtained, there should be a law compelling parents and guardians of native children to send their children to school regularly unless they are excused for good reasons.

The reindeer in Alaska, according to latest reports, numbered 33,629, of which 60 per cent are owned by 460 natives, while the Government owns only 11 per cent. In October, 1911, there were shipped from Nome to Seattle 125 reindeer carcasses purchased by a cold-storage company from Eskimo herders. This shipment of approximately 18,750 pounds found a ready sale in Seattle, and marked the beginning of the exportation of reindeer meat from Alaska.

By Executive order a tract of land approximately 12 square miles has been reserved on the west shore of Prince of Wales Island for the Hydah Tribe, formerly living in the villages of Klinquan and Howkan. They have established a village and named it Hydaburg, have organized a trading company for the transaction of mercantile business, and a lumber company. With assistance rendered by the bureau, a sawmill has been installed and the members of the tribe are given instruction in its operation. According to reports received the colony is in a flourishing condition.

TERRITORIES.

Since the transfer under Executive order of July 15, 1909, of the supervision of affairs in Porto Rico to the Insular Bureau of the War Department, the former Territories of New Mexico and Arizona have been admitted as States, and there now remains under this Department the supervision of but two Territories, Alaska and Hawaii.

ALASKA.

During the past year there was probably a small increase in the number of residents in Alaska engaged in industries of a permanent character, but there was apparently a considerable decrease in the population of Alaska as a whole. The gain in white population, excluding Russians and native people, between the census years 1900 and 1910 was 5,854, or 19 per cent. The native population has probably remained stationary in number since 1910, when the total number of people in the Territory, both white, native and mixed, was 64,356. The moderate decline in white population which has been experienced in the last two years is due in part to diminished activity in placer mining in the interior valleys, probably in at least an equal

measure to inadequate laws, and the consequent withdrawal of much of the public lands and natural resources from development.

Some encouragement has been derived, however, from the recent legislation authorizing an examination and report by a board of experts on feasible railroad routes from tidewater to the interior, from the favorable action of the Senate Committee on Public Lands on a coal-lease bill, and from the law providing a local legislature. The investigation authorized in relation to feasible railroad routes is regarded as of the highest importance, since cheap transportation is a prime factor in early territorial development. The local legislative body, however, provided by the act of August 24, 1912, has but restricted powers and can not be expected to solve the main problems of Alaska. These must necessarily be dealt with by Congress alone.

ASSESSED VALUATION AND TAXES.

There are now 16 incorporated towns in the Territory, one of which was added during the year. The assessed valuation of property in nine of these incorporated towns is stated to be approximately \$3,880,859, and the tax rate of eight of these towns is stated as ranging from one-half of 1 per cent to 2 per cent. The amount of taxable property in incorporated towns is relatively small and appears to be increasing very slowly.

COMMERCE.

The merchandise shipments, including precious metals and copper, increased materially, the total commerce between Alaska and the United States and between the Territory and foreign countries aggregating \$62,680,507. The merchandise shipments to Alaska from the States aggregated in value \$18,809,270, as against \$15,736,510 for 1911, and against \$17,811,093 in the heretofore banner year of 1907. There was a large increase in the shipments of material required in connection with the canning of fish, which industry has greatly expanded. Dredging machinery to considerable value was also shipped into the Territory. The total shipments, including copper but not precious metals, from Alaska to the States were valued at \$20,776,756, being an increase of nearly \$7,000,000 over 1911, when the total was \$13,813,824. Of the large increase, more than \$4,000,000 was in copper ore and nearly \$3,000,000 in canned salmon. There was a decrease in the coal shipments during the year, probably due to the increase in the use of fuel oil by several large consumers in the Territory.

MINES AND MINING.

The most notable events in the mining industry during the last year have been the increase in the output of copper ore in the Chitina

and Prince William Sound regions and in the preparations for a very large gold quartz development in the Juneau district.

The mineral output in 1911 is estimated at \$20,650,000, of which \$16,104,310 was of gold and silver. On account of a large increase in the output of copper in the last calendar year, there was a gain in mineral production as a whole, although there was a slight falling off in the gold output, this loss amounting to \$883,680.

FISHERIES.

Attention is called to the great importance of the marine wealth of Alaska and the vital need of supplementary legislation to protect and develop the fishing industry. A review of the recently completed detailed statistics for 1911 shows that there were 17,932 persons engaged in all branches of the fisheries of Alaska during that calendar year, an increase of 2,312 over the number of persons so engaged in 1910. It is gratifying to note additional increases in the number of natives of Alaska employed.

The total investment in all branches of the fisheries in 1911, exclusive of that in the vessel fisheries for offshore cod and halibut, was \$22,617,387. Of this amount, \$19,931,215 was invested in the salmon-canning business and \$623,126 in salting and mild curing salmon, \$1,194,073 in the halibut fishery, \$295,220 in the herring fishery, and \$215,670 in the central Alaska cod fishery.

At present there are five private and two Government hatcheries in operation. The governor recommends that the rebate system as applied to operators of private hatcheries be abolished and that such establishments be taken over at fair valuation by the Federal Government, thereafter to be operated by the Bureau of Fisheries. A discussion of the rebating system or remission of taxes appears in the 1911 report of the Alaska Fisheries and Fur Industries, which document is issued by the Bureau of Fisheries. The following is quoted on this subject:

The principle of encouraging the operation of private hatcheries by remitting taxes on the commercial output of the fisheries is subject to criticism on the ground that the remission is discriminatory in that it favors the fishing industry solely, whereas the tax on other industries is of general benefit, and therefore is in true sense a tax for revenue.

The governor calls attention to the need of more hatcheries, and suggests that five new hatcheries be provided on the following waters or tributaries thereof: Bristol Bay, two; and Chignik Bay, Icy Straits, and Lynn Canal, one each.

Some of the fishing interests, it appears, have urged that the tax moneys now levied upon and collected from the salmon-packing industry should be directly applied to the construction and mainte-

nance of hatcheries, instead of being covered into the "Alaska fund" under the provisions of the act of January 27, 1905, and then disbursed, as at present, for the maintenance of schools and the construction of wagon roads outside of incorporated towns. This proposition should not be favorably considered. The soundest reasons argue against it. Disregarding the doubtful policy of extending the occasional practice of applying certain tax moneys to exclusive purposes, it should be necessary only to say that if the Alaska salmon taxes should be diverted from the "Alaska fund," where they serve two chief objects of a permanent and indispensable character, it would probably become impossible to maintain the school system without special appropriations. It would certainly be impossible to build more wagon roads from the moneys of this fund, and it might become difficult fully to maintain the present roads, of which there is a large mileage.

In order that the fishing industry of Alaska in its present enormous proportions may receive adequate supervision, Congress should make provision for several additional government agents, and for at least two more boats for their use.

I concur in the recommendation of the governor that legislation be enacted prohibiting the use of herring or other food fishes for the manufacture of fertilizer or oil, after an equitable period within which present concerns may close up their business.

AGRICULTURE.

During the fiscal year the work of the Alaska experiment stations has been highly successful. As a result of an unusually long summer in 1911, vegetables, particularly potatoes, matured well, except at interior points, where growth was prevented by a killing frost which occurred August 31.

Grain breeding at the Rampart station promises success, and tests are being made of the several hybrid varieties of barley already developed. Oats, although early in maturing, are not found to be heavy yielders. Kharkov winter wheat was badly winter killed, the snowfall not being heavy enough to protect it, but winter rye, which is hardier than winter wheat, gives promise of a good crop, and is of more importance in all northern latitudes where grain is grown.

At the Sitka station the hybrids obtained by the crossing of several cultivated varieties of strawberry with the wild strawberry of the Alaska coast are more successful than ever before.

Work at the Kodiak station in the breeding of cattle and sheep has met with signal success, but the grazing in the part of Kodiak Island where the station is situated was damaged by a heavy fall of volcanic ashes last summer.

COAL LANDS.

The conditions surrounding the coal-bearing areas of Alaska have not changed essentially since last year, except that the distressing need of cheap native fuel for the development of the Territory's other resources has been even more strongly emphasized by the prolonged period of congressional inaction. The governor reports that the residents of the Territory generally are willing to accept any measure which will cause the fuel resources to be opened to development—so much so that the comparative advantages of a fee system, a leasing plan, or government operation have almost ceased to be a matter of discussion.

The importation of coal from the coast States and from British Columbia has declined to a considerable degree, probably because of the installation of oil-burning apparatus by several of the larger consumers who are situated near tidewater. Fuel oil is being used at Cordova, only a few miles from the dormant Bering River coal beds, at a cost equivalent to about \$8 per ton for bituminous coal.

The importations of coal into Alaska from the States and from foreign countries amounted to 71,452 tons, valued at \$365,557, as against 109,450 tons, valued at \$558,123, in the year 1911. These figures, however, do not include coal from foreign countries via the United States, the amount of which in 1911 was 6,447 tons, valued at \$56,580. In addition to the above, there were shipments of 336 tons of coke in 1911 and of 100 tons in 1912.

The open-market prices at which bituminous coal was sold at several of the towns on the seacoast of Alaska, including the charge for delivery to the premises of the consumer, were as follows: For long-ton weights, except at Juneau and Skagway: Juneau, \$10; Ketchikan, \$11.50; Skagway, \$13; Wrangell, \$14; Cordova, \$17.50; Unalaska, \$15; Nome, \$21.30.

NATIVE INHABITANTS.

The condition of the Indians in the southeastern part of the territory, and to some extent in other sections, has been beneficially affected by the vigorous prosecution of whisky peddlers and "bootleggers" during the last year. The natives generally of Alaska are self-reliant, and many of them engage in profitable business, especially in the commercial fisheries, and to some extent in the mines of southeastern Alaska. The natives of the Copper River Valley and the Aleutian Islands are poorer than those of other parts of the Territory, but extreme poverty is not prevalent, although many natives suffer from sickness every year and many others are afflicted with chronic diseases. Increased funds are needed for the education of the natives and for the furtherance of plans for sanitation and medical treatment among the Indians, Aleuts, and Eskimos.

The governor states that he does not favor any project looking to the placing of Alaska natives on reservations, since that would almost surely tend, under any system likely to be devised, to impair the self-reliant spirit for which these people generally are noted.

ROADS AND TRAILS.

The importance of wagon roads and trails to the development of the Territory is similar if not actually commensurate with that of railroads. The valuable work carried on by the board of road commissioners for Alaska has illustrated this fact for several years. Productive industries and commerce to the amount of millions of dollars are dependent upon the wagon roads already constructed, and I urge that increased appropriations for this work be authorized.

AIDS TO NAVIGATION.

A greater number of lights and other aids to navigation have been installed each year for the last three years in Alaska waters than had been installed in the entire history of the Territory prior to 1910. The general importance of such aids in northern waters is self-evident, when it is considered that the number of vessels plying between Alaska and ports outside of the Territory is larger than ever before, and the transportation of passengers to and fro reaches larger proportions than the extent of the population would indicate. Whether due to the greater safety of navigation or not, freight carrying charges between the ports of southeastern Alaska and those of Puget Sound have been reduced by approximately 50 per cent within the last two years. In any event the installation of lights and buoys is to be regarded as a matter of great economic as well as humane importance, calculated to reduce the cost of ocean transportation, and hence promote the development of the Territory's resources.

TERRITORIAL LEGISLATURE.

Pursuant to the act of Congress approved August 24, 1912, entitled "An act to create a legislative assembly in the Territory of Alaska, to confer legislative powers thereon, and for other purposes," an election was held in the Territory in November of 1912 for members of the legislature, and the assembly will hold its first session beginning in March, 1913.

PUBLIC BUILDINGS.

The governor calls attention to the fact that the work on the general office building, intended to provide quarters for the post office, customhouse, governor's office, surveyor general's office, and several other important offices of the Government in Juneau, which

was authorized by the act of 1910, has not been commenced, although an excellent site has been acquired at a fairly reasonable price. He states that the limit of cost of \$200,000 for the building and site was not large enough at the time it was authorized, but since that time a Territorial legislature has been provided for and the first legislature will be obliged to rent quarters for its use. In order to provide a suitable capitol building, with accommodations for the legislative assembly and all the various government offices located at Juneau, the limit of cost referred to should be increased to at least \$500,000.

GOVERNOR'S OFFICE.

The appropriation for clerk hire in the governor's office is limited to \$2,250 per annum, which is large enough for the employment of only one first-class clerk or private secretary. The present secretary, it is stated, has been doing double work for the last year and a half, as the business of the office has increased several fold since 1909, and even since 1910. Under the terms of the act of Congress creating the Territorial legislature several specific duties, such as the disbursement of all funds for the legislature, have been imposed upon his office. It will be absolutely impossible for one clerk to do the work; and the request submitted in the annual estimates for an additional allowance of \$1,800 for clerk hire should, therefore, be granted.

HAWAII.

During the past summer, in the performance of official duty, I had occasion to visit the Territory of Hawaii and to conduct an investigation into the economic conditions existing there, especially as these conditions affect the disposition and development of the public lands, and the character and conduct of the transportation facilities, upon which the development of these lands largely depend. A series of daily public hearings extending over nearly four weeks was stenographically reported, but the transcript has not yet been received at the office of the Department. If practicable after its receipt it is my intention to comment further upon this investigation in a future report to you. In any event the record of the inquiry will be filed in the Department, and contains much information which should be of value in the future administration of the affairs of the Territory.

The governor in his annual report states that the year has been the most prosperous in the history of the Territory.

Imports and exports aggregated \$84,143,760, an increase of \$14,692,597. The imports were \$28,694,322, an increase of \$1,181,742, and the exports \$55,449,438, an increase of \$13,510,855. About nine-tenths of the trade is with the United States and about nineteen-

twentieths of the freight is carried in American vessels. The customs receipts were \$1,643,197.37, a decrease of \$11,563.97. The internal-revenue receipts were \$226,225.42, an increase of \$47,486.28.

Territorial receipts greatly exceeded expenditures, the net cash balances in all revenue accounts at the close of the year showing an increase of \$232,735.71. The total revenues collected by the Territory and counties aggregated \$4,315,972.76, an increase of \$556,136.36, of which \$2,560,505.88 went to the Territory and \$1,755,466.88 to the counties. Out of \$3,641,556.60 available to the Territory out of current revenues, including cash on hand, \$2,327,770.17 was expended.

Territorial 4 per cent bonds were paid to the amount of \$50,000, and additional public improvement 4 per cent bonds were issued to the amount of \$1,500,000 at 101.583, and since the close of the year additional bonds have been issued to the same amount at 100.588. At the close of the year the bonded indebtedness was \$5,454,000, or 3.08 per cent of the assessed value of property. A portion of this indebtedness was incurred for county improvements. There are no county bonds.

A new tax system was inaugurated, placing the Territory and each county on an independent and elastic financial basis. The assessed value of property increased from \$154,584,032 to \$176,834,801.

Bank deposits at the close of the year aggregated \$18,189,135.50, an increase of \$2,878,871.99. The capitalization of domestic corporations was \$168,217,578 at the close of the year, an increase of \$11,344,550. New fire, life, and marine insurance was written to the amount of \$96,213,859.42.

The population in 1910 was 191,909. This census was commented upon in the annual reports for 1910 and 1911. It may be of interest, however, to repeat that the population by races is as follows: Hawaiians, 26,041, a decrease of 3,746 between 1900 and 1910; Part-Hawaiians, 12,506, an increase of 4,658 (of these 8,772 are Caucasian-Hawaiians and 3,734 Asiatic-Hawaiians); Portuguese, 22,303, an increase of 6,628; Spanish, 1,990; and Porto Ricans, 4,890 (both new); other Caucasians, 14,867, an increase of 4,290; Chinese, 21,674, a decrease of 4,088; Japanese, 79,674, an increase of 18,559; and all others (including 4,533 Koreans, 158 blacks, 537 mulattoes, and 2,736 others), 7,964, an increase of 4,727.

During the last two years the births in the Territory numbered 9,641 and the deaths 6,397, of which 5,147 births and 3,071 deaths occurred during the past year. In unassisted immigration there has been an increase of Americans and a decrease of Japanese. Owing to a constant excess of arrivals over departures of Japanese women, there is an increasing number of Japanese births in the Territory. Assisted immigration has been chiefly of Europeans—that is, Portuguese, Spanish, and Russians—by the Territorial government

and of Filipinos by the Hawaiian Sugar Planters' Association. Of the former 3,513 and of the latter 3,043 were introduced during the year. During the last five and a half years the Territory has introduced 5,288 Spanish, 4,962 Portuguese, and 2,056 Russians, a total of 12,306, at a cost of about \$900,000, and during the last three years the sugar planters have introduced 7,973 Filipinos. The percentage of non-Asiatic laborers on the sugar plantations has increased to 31.28. Wages are reported to have materially increased during the year.

During the year 483 homesteads, or more than twice as many as for any preceding year, were taken, notwithstanding the more stringent provisions of the amendments of the organic act to secure genuine homesteading. The percentage of homesteads taken by Americans and other Caucasians has been larger than usual. A marketing bureau and additional demonstration farms have been established and some progress has been made toward putting homesteading on a more satisfactory basis in other ways. The topographic survey has made rapid progress on the island of Hawaii after completing the island of Kauai, and the hydrographic survey has been greatly extended on all the principal islands. Steps have been taken for the construction of several large irrigation ditches. The proceeds of sales and leases of public lands should be made available for the construction of homestead roads as well as for surveying and opening homesteads.

Transportation facilities have improved. Ten large ocean steamers are under construction, and one new steamer was added for the inter-island traffic. Dredging and breakwater construction has progressed in several harbors, and contracts have been let for many new wharves. There has been considerable railroad construction. Wireless communication was established with the Pacific coast and arrangements are being made for establishing it with Japan. Appropriations should be made by Congress for continuing work on the harbors at Honolulu, Hilo, and Kahului and beginning work on the harbor of Nawiliwili.

The year has been especially marked by the construction of public works, mainly roads, water and sewer works, wharves and harbors, public school buildings and other public buildings, for which about \$4,000,000 are available for the present biennial period.

The year has been the most important in the school history of the Territory. A new and largely automatic arrangement was established for financing the schools, which has increased the amount available for schools about 30 per cent, resulting in a great increase in the number of teachers and pupils, and also in the average teaching efficiency through the payment of higher salaries. Many new school buildings were constructed. At the close of the year there were 29,909 pupils in the schools, of whom 23,752 were in the public schools.

More than usual attention was given to the public health, which is one of the largest subjects with which the Territorial government has to do. The more important special features of the year were a vigorous mosquito campaign in Honolulu, following the first and only case of yellow fever that has occurred in the Territory, and a rat campaign in the districts of Hilo and Hamakua on the island of Hawaii, in consequence of plague having become endemic in those districts.

The Federal military forces have been increased. Work has proceeded rapidly on the Pearl Harbor Naval Station, the dredging of the harbor channel was completed, and the flagship *California* of the Pacific Fleet entered the harbor to the naval station. The flagship of the second division of that fleet visited Palmyra Island for the purpose of confirming the title of the United States to it as a part of the Territory of Hawaii.

NATIONAL PARKS AND RESERVATIONS.

By the act of Congress approved March 1, 1872, establishing the Yellowstone National Park, Congress inaugurated the policy of setting aside land as recreation grounds for all the people. Since that time additional lands in various sections of the country have been set aside for such purposes, as well as for the preservation of the wonders of nature therein from desecration and for the protection of the flora and fauna. These national parks, now aggregating 12 in number, embrace over 4,500,000 acres of land, and there should be speedily added thereto the Grand Canyon of the Colorado River with its wonderful scenic features, for the creation of which as a national park recommendations have been submitted to Congress.

The areas of these parks, with date of establishment of each, are as follows:

Areas of national parks.

Name.	Date of establishment.	Acres.
Yellowstone, in Wyoming, Montana, and Idaho.....	Mar. 1, 1872	2, 142, 720. 00
Yosemite, in California.....	Oct. 1, 1890	719, 622. 00
Sequoia, in California.....	Sept. 25, 1890	161, 597. 00
General Grant, in California.....	Oct. 1, 1890	2, 536. 00
Mount Rainier, in Washington.....	Mar. 2, 1899	207, 360. 00
Crater Lake, in Oregon.....	May 22, 1902	159, 360. 00
Wind Cave, in South Dakota.....	Jan. 9, 1903	10, 522. 00
Sullys Hill, in North Dakota.....	Apr. 27, 1904	780. 00
Platt, in Oklahoma.....	July 1, 1902	848 22
	Apr. 21, 1904	
Mesa Verde, in Colorado.....	June 29, 1906	42, 376. 00
Five-mile strip for protection of ruins.....	do	175, 360. 00
Hot Springs Reservation, in Arkansas.....	June 16, 1880	811. 63
Glacier, in Montana.....	May 11, 1910	981, 681. 00
Total.....		4, 606, 153. 85

The constantly increasing number of persons, not only from this country but from abroad, who visit these national parks as a means

of recreation and to view the wonders therein clearly indicates the great interest taken by the public in these parks. The total number of visitors to all the parks during the past year aggregated approximately 229,084, as against 224,000 in 1911 and 198,506 in 1910. Future travel to these reservations will doubtless be greatly augmented, particularly during 1915, when the Panama-Pacific International Exposition will be held in San Francisco.

The economic value of tourist traffic to these reservations is evidenced by the financial reports of concessionaires in two of the largest parks, to wit: In Yellowstone, where the gross receipts in 1911 aggregated \$1,050,039, and in Yosemite, for the same year, where it aggregated approximately \$295,500. In my last annual report I called attention to the fact that the superintendents of the various parks were brought together at a conference held under my direction in the Yellowstone National Park in September, 1911, for the purpose of discussing the many difficult problems presented in the administration of affairs of each reservation, with very satisfactory results. In October of the present year a second conference of the various park superintendents was held under my direction in Yosemite National Park, at which there were in attendance the chief clerk and other representatives of this Department, representatives of the Departments of Agriculture and War, of various transcontinental railroads, and of many concessionaires in the parks, as well as a large number of persons interested in national-park matters. Various phases of park administration were discussed, including camp and hotel accommodations, sanitation, transportation, construction of roads, trails, and bridges, forestry, fire protection, protection of game, and the use of motor-driven vehicles on the roads, etc. The information acquired as a result of the consideration of the various matters presented will doubtless result in more effective administration in many respects. The consensus of opinion, however, at this conference, as well as of that of 1911, was that the development of the national parks should proceed along more liberal lines than heretofore, and that the supervision of activities therein be centralized in a bureau especially charged with such work, and a measure looking to this end is now pending in Congress.

The laws relating to all the parks, excepting the Yellowstone National Park, should be amended so as to authorize the Secretary of the Interior to grant leases for periods of 20 years or less, with provisions for renewal or for payment for the lessee's appropriate improvements at the end of the lease. The present limitation of 10 years in most of the reservations is not such as to induce capital to make investments in buildings and hotels, etc.

It is of special and urgent importance that provision should also be made by Congress for the extinguishment of private holdings in

the several parks. These holdings seriously interfere with the proper administration of the parks and impair their usefulness and beauty in many ways. They can be extinguished either by way of direct appropriation for their purchase, or by authorizing their exchange for lands or timber within the particular parks or within the national forest reserve adjacent thereto. The public timber so exchanged can, in many cases, be confined to dead or matured timber which can be removed from the parks without injuriously affecting the scenic beauty thereof. If authority of this sort is vested in the Secretary of Agriculture and the Secretary of the Interior, as to the reserves of which they have jurisdiction respectively, exchanges of park or forest lands or timber can be made for appropriate strips of private timbered lands along the public roads within the exterior limits of the parks or forest reserves, so as to protect the scenic beauty of these roads from impending destruction.

NATIONAL MONUMENTS AND PRESERVATION OF AMERICAN ANTIQUITIES.

By an act approved June 8, 1906, entitled "An act for the preservation of American antiquities," the President of the United States is authorized, "in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments." Under such authority the President has created the following monuments:

National monuments administered by Interior Department.

Name.	State.	Date.	Area.
			<i>Acres.</i>
Devils Tower.....	Wyoming.....	Sept. 24, 1906	1,152
Montezuma Castle.....	Arizona.....	Dec. 8, 1906	160
El Morro.....	New Mexico.....	do.....	180
Chaco Canyon.....	do.....	Mar. 11, 1907	120,629
Muir Woods ¹	California.....	Jan. 9, 1908	295
Pinnacles.....	do.....	Jan. 16, 1908	2,080
Tumacacori.....	Arizona.....	Sept. 15, 1908	10
Mukuntuweap.....	Utah.....	July 31, 1909	15,840
Shoshone Cavern.....	Wyoming.....	Sept. 21, 1909	210
Natural bridges ²	Utah.....	Sept. 25, 1909	12,740
Gran Quivira.....	New Mexico.....	Nov. 1, 1909	160
Sitka.....	Alaska.....	Mar. 23, 1910	157
Rainbow Bridge ³	Utah.....	May 30, 1910	160
Lewis and Clark Cavern.....	Montana.....	May 16, 1911	160
Colorado.....	Colorado.....	May 24, 1911	13,883
Petrified forest.....	Arizona.....	July 31, 1911	25,625
Navajo ⁴	do.....	Mar. 14, 1912	360

¹ Estimated area.

² Donated to the United States.

³ Originally set aside by proclamation of Apr. 16, 1908, and contained only 120 acres.

⁴ Within an Indian reservation.

⁵ Based on 15 known ruins with a reserved area of 40 acres surrounding each ruin. Exterior limits of tract specified in proclamation contain 918,310 acres.

The Navajo National Monument as originally created by proclamation of March 20, 1909, embraced approximately 600 acres within the Navajo Indian Reservation, which was reserved tentatively and with a view to reduction to such small tract or tracts as might thereafter be found to contain valuable prehistoric pueblo or cliff dwellings, when the extent of the same could be determined by an examination on the ground and their locus definitely fixed by traverse lines connecting them with some corner of the public survey. Both of these conditions having been fulfilled, the monument was reduced by proclamation dated March 14, 1912, to three small tracts aggregating 360 acres. Within two of these tracts are located, respectively, two interesting and extensive pueblo or cliff-dwelling ruins in a good state of preservation and known as "Betata Kin" and "Keet Seel," and a third cliff-dwelling ruin called "Inscription House," located on Navajo Creek. "Inscription House" is regarded as extraordinary, not only because of its good state of preservation but because of the fact that upon the walls of its rooms were found inscriptions written in Spanish by early explorers and plainly dated 1661.

The Mount Olympus (Washington) National Monument was set aside by proclamation dated March 2, 1909, and contains approximately 608,640 acres. It was reduced by proclamation dated April 17, 1912, to 608,480 acres, in order to permit certain claimants to land therein to secure title to the land.

The supervision of these various monuments has, in the absence of any specific appropriation for their protection and improvement, necessarily been intrusted to the field officers of the Department having charge of the territory in which the several monuments are located. This supervision in many instances is necessarily limited, and considerable difficulty has been experienced in protecting the monuments from vandalism, unauthorized exploration, and spoliation. An estimate for an appropriation of \$5,000 has been submitted to Congress for the protection and improvement of these reservations. Only such monuments as in the judgment of the Secretary of the Interior are subject to depredations by vandals and unauthorized collectors should be provided with a custodian or superintendent and then only when such danger really exists. In this way a small general appropriation can be made available and adequate for the whole field.

The following national monuments are not administered by the Secretary of the Interior. Those that should be continued should be placed under the proposed bureau of national parks.

National monuments administered by Department of Agriculture.

Name.	State.	Date.	Area.
Cinder Cone.....	California.....	May 6, 1907	<i>Acres.</i> 15,120
Lassen Peak.....	do.....	do.....	1,280
Gila Cliff Dwellings.....	New Mexico.....	Nov. 16, 1907	160
Tonto.....	Arizona.....	Dec. 19, 1907	640
Grand Canyon.....	do.....	Jan. 11, 1908	1806,400
Jewel Cave.....	South Dakota.....	Feb. 7, 1908	1,280
Wheeler.....	Colorado.....	Dec. 7, 1908	1,300
Oregon Caves.....	Oregon.....	July 12, 1909	1,800
Devils Postpile.....	California.....	July 6, 1911	1,800
Mount Olympus.....	Washington.....	Apr. 17, 1912	1,608,480

¹ Estimated area.*National monument administered by War Department.*

Name.	State.	Date.	Area.
Big Hole Battlefield.....	Montana.....	¹ June 23, 1910	<i>Acres.</i> 5

¹ Set aside by Executive order.**ELEEMOSYNARY INSTITUTIONS.****GOVERNMENT HOSPITAL FOR THE INSANE.**

On June 30, 1912, there were remaining in the hospital 2,898 patients as against 2,862 remaining on June 30, 1911, an increase of 36 over the previous year. There were admitted during the year 733 patients, an increase of 110 over the previous year. The total number of patients treated during the year was 3,595, an increase of 56 over the previous year. The number of discharges during the year, including deaths, was 697, an increase of 20 over the previous year. The daily average number of patients was 2,871.75 as against 2,884 for the previous year, a decrease of 12.15.

The training school for nurses graduated 7 male and 10 female nurses.

When we note that the number of admissions for the year amounts to 733, having been exceeded only upon two previous occasions, namely, in 1902-3, when the admissions were only 734, and in 1903-4, when there were 766, the years following closely upon the Spanish-American War and the occupation of the Philippines, it will be seen that a considerably more rapid increase in the number of patients of the hospital is to be expected from now on.

Patients during fiscal year ended June 30, 1912.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Remaining June 30, 1911.....	1,723	383	478	263	2,802
Admitted during the year.....	455	88	110	80	733
Total number under treatment.....	2,188	471	588	343	3,506
Discharged:					
Recovered.....	92	14	21	19	146
Improved.....	25	8	10	9	52
Unimproved.....	65	7	22	8	102
Not insane.....	45	9	6	5	65
Died.....	199	59	43	31	332
Total.....	426	97	102	72	697
Remaining June 30, 1912.....	1,762	374	486	276	2,808

During the year a committee of six, consisting of Surg. Gen. George H. Torney, United States Army, representing the Secretary of War; Surg. A. W. Dunbar, representing the Secretary of the Navy; Mr. Robert V. La Dow, superintendent of prisons, representing the Attorney General; Maj. William V. Judson, Corps of Engineers, United States Army, representing the Commissioners of the District of Columbia; Mr. Scott C. Bone, representing the Board of Visitors of the Government Hospital for the Insane; and Dr. William A. White, superintendent of the Government Hospital for the Insane, representing the Secretary of the Interior, appointed by the Secretary of the Interior, after consultation with the President, went into a full investigation of the needs of the hospital and the future policy for its growth and development. The result of their deliberations was printed in the form of a report, transmitted to the Secretary of the Interior, and which was later transmitted by you to Congress (S. Doc. 256, 62d Cong., 2d sess.). This report discusses very fully the need of the hospital under four heads: (a) Defects in the laws governing the conduct of the institution and the commitment of patients. Under this head a draft of proposed legislation is included for commitment from the District of Columbia, along with certain changes in the legislation with reference to the transfer of Federal prisoners to the hospital. (b) The advisability of continuing in the hospital patients committed from the District of Columbia and from the Army and Navy and from distant points. Under this head is discussed the whole question of the future policy of the hospital with reference to the commitment of patients from distant points. (c) The policy to be adopted relating to the growth of the institution, and the matter of additional lands, buildings, equipment, etc. Here the questions of administration, size of the institution, and its physical needs are discussed, together with a special report as to the care of the criminal insane.

(d) The present conduct of the institution, including recommendations for improvement of the service and the advancement of the interests of the inmates. Under the third section the needs of the hospital are set forth. This report should be acted upon by Congress.

The guards on the Howard Hall Building for insane convicts have all been strengthened, and additional tool-proof guards have been installed. The doors have been reenforced and iron plates put over the face of the locks. This building has now been put in as safe condition as it can be without further appropriation from Congress.

The President's Commission on Economy and Efficiency has made an investigation and preliminary report of the work of the hospital.

The general health at the institution has, on the whole, been good throughout. Two cases of typhoid fever developed among the employees of the hospital, both of which were traceable to outside infection. There have been a number of cases of malaria, which, however, were due to the stagnant water resulting from the filling in of the river flats. Efforts have been made to minimize this by more extensive screening of the buildings.

Thirty-two original articles have issued from the different members of the staff of the hospital during the year, some of the more important of which have been collected into a bulletin which is going to press at the close of the year.

Field work has been taken up, particularly in connection with the discharge of patients, so that the hospital now has a field officer who visits the homes of patients and brings first-hand information to the hospital to aid in the solution of questions of discharge, parole, etc.

FREEDMEN'S HOSPITAL.

There were received into the hospital during the year 3,093 patients, and 292 births occurred. These, with 176 remaining from the preceding year, make a total of 3,561 indoor patients receiving the benefits of the hospital, an increase of 661 over the last fiscal year. Of those under care, 1,853 were chargeable to the District of Columbia and 1,708 to the General Government.

There were discharged during the year 3,056 patients, of whom 1,350 had recovered, 1,280 improved, 188 unimproved, 7 not treated, and 231 died, leaving 213 in the hospital at the close of the year, 89 of whom were residents of the District of Columbia and 124 were from the States. The percentage of deaths from all causes was 2 per cent less than last year. The surgical work involved 1,922 operations, an increase of 155 over the previous year. In the out-patient department 5,710 were treated, an increase of 871 over last year.

In the act "making appropriations for the sundry civil expenses of the Government for the fiscal year ending June 30, 1906, and for

other purposes," approved March 3, 1905, it was provided, among other things, as follows:

The Secretary of the Interior is authorized to enter into contract with the Board of Charities of the District of Columbia for the care and treatment of persons from the District of Columbia admitted to the Freedmen's Hospital; and any money that may be received, from this source, on and after July first, nineteen hundred and five, shall be paid to the Secretary of the Interior, to be applied to the uses and purposes of the hospital.

The account of the Board of Charities with the District of Columbia under the various contracts made for the care of the District indigent from 1906 to 1912 shows a total unpaid balance up to June 30, 1912, of \$78,745.57. It is hoped that the Commissioners of the District may see their way clear to include in future estimates to Congress a sum sufficient to cover the contract price for the care of all patients who have been admitted to the hospital as residents of the District of Columbia. The bill rendered during the past year for the care and treatment of this class of patients amounted to \$39,239.86, or \$5,239.86 more than the appropriation received for this purpose.

The training school for nurses has completed its eighteenth year of work and is represented by 223 graduates. These women are engaged successfully in private nursing, and not a few are engaged in institutional work in various parts of the country. At the graduating exercises held on May 10, 1912, six nurses received their diplomas.

In the act "making appropriations to provide for the expenses of the District of Columbia for the fiscal year ending June 30, 1913, and for other purposes," approved June 26, 1912, provision is made, under the head of "Medical charities," as follows:

Hereafter patients may be admitted to Freedmen's Hospital for care and treatment on the payment of such reasonable charges therefor as the Secretary of the Interior shall prescribe. All money so collected shall be paid into the Treasury to the credit of Freedmen's Hospital, to be disbursed under the supervision of the Secretary of the Interior for subsistence, fuel and light, clothing, bedding, forage, medicine, medical and surgical supplies, surgical instruments, repairs, furniture, and other absolutely necessary expenses incident to the management of the hospital, a report as to the expenditure thereof to be made annually to Congress.

Appropriate regulations have been made for carrying into effect the provisions of the statute, and a number of persons have been accommodated at the hospital under this authority and the moneys received for the services rendered them covered into the Treasury.

Under existing regulations governing the hospital the valuables and effects of patients who die in the hospital are turned over to their heirs or legal representatives, but where the latter can not be located it is necessary to retain the same at the hospital. In order to relieve the hospital of the care of such property appropriate legislation should be enacted by Congress authorizing the disposition thereof.

HOWARD UNIVERSITY.

Howard University was incorporated by the act of March 2, 1867 (14 Stat., 338). The purpose of the incorporation, named in the first section of the act, was "for the education of youth in the liberal arts and sciences." The incorporators were declared to be "a body politic and corporate, with perpetual succession," etc. Control of the university was vested in a board of seventeen trustees. The incorporators and their successors were authorized to take, for the university, property of any character, "by gift, devise, grant, donation, bargain, sale, conveyance, assurance, or will;" to transfer or lease any of the property of the university; and to place at interest, in such manner as the majority of the incorporators or their successors should decide, any funds belonging to the university, and with the general powers usually conferred on corporations with reference to the right to sue and be sued in any courts of law and equity in actions of any character. Congress reserved the right to alter, amend, or repeal the act of incorporation.

The enrollment of the university for the last year was 1,409 from 37 States and 8 foreign countries. This number does not include 35 students who took work in the school of theology by correspondence. The number of students in the different departments was as follows:

College of arts and sciences.....	243
Teachers' college.....	139
School of theology.....	97
School of medicine.....	341
School of law.....	121
Academy.....	355
Commercial college.....	102
Students in music.....	75
Manual arts and domestic science.....	227
Names duplicated because of students taking special courses in different departments.....	291

Two hundred and eighteen students completed their studies in the university, as follows:

School of theology.....	27
School of medicine.....	36
School of dentistry.....	28
School of pharmacy.....	10
School of law.....	28
College of arts and sciences.....	31
Teachers' college.....	10
Domestic arts and domestic science.....	8
Normal course.....	4
Kindergarten.....	1
Academy.....	29
Commercial college.....	5
Music department.....	1

The school of theology receives no aid from Congress, but is supported entirely through endowments and special gifts. It requires no doctrinal tests, is interdenominational, and is open for all who are preparing for efficiency in moral and religious work.

Although the institution was established in 1867, no appropriation was made by Congress for its support until March 3, 1879, when \$10,000 was appropriated "for maintenance." From March 3, 1879, to August 24, 1912, Congress appropriated for the university a total of \$1,478,340.

A report of the treasurer of the university, dated November 8, 1912, shows that on September 30, 1912, the total value of all property belonging to the university was \$1,668,902.64, of which \$393,917.36 represents endowments, including land other than that used directly. The sum of the appropriations made by Congress and the endowments is \$1,872,257.36, and the plant, therefore, as it stood on September 30 was worth \$203,354.72, less than the aggregate amount of the endowments and the total amount appropriated by Congress for all purposes. During the last year there was a decrease in the total amount of the endowments, which was occasioned by reason of the sale of lot 17, square 3060, to the District of Columbia, at a price less than that at which it was carried on the books of the university, and because of the readjustment of special assessments on the unproductive property. The total deductions amounted to \$1,694.10. Under existing law this Department has no representative on the board of trustees, although it has for several years given administrative examination to the accounts of the special disbursing officer handling appropriations made by Congress for the university. Neither has the Government title to any buildings erected or improvements made to buildings from congressional appropriations. In the annual report for last year with reference to this subject I said:

Considering the magnitude of the appropriations made by Congress for the maintenance, improvement, etc., of the university, and the statement of the president thereof, it is manifest that the Government should have greater supervision over the institution, and it is therefore recommended that the act of incorporation of March 2, 1867, be so amended as to give the Government a proper representation on the board of trustees, that appropriations made by Congress shall be expended under the direction of the Secretary of the Interior, and that the institution be required to protect the United States against possible transfer or loss of the lands upon which buildings have heretofore or may hereafter be erected from funds provided by the Government.

This recommendation is renewed.

THE COLUMBIA INSTITUTION FOR THE DEAF.

The total enrollment for last fiscal year was 130 students, of which 68 were males and 62 females. Eighty-five were enrolled in the collegiate department, representing 27 States, the District of Colum-

bia, and Canada, and 45 attended the primary department. Thirty-six students were admitted as beneficiaries from the District of Columbia. During the fiscal year 33 were discharged from the institution by graduation and otherwise. The course of instructions as adopted early in the year was carried into effect, with the addition of practical instructions in dairy work, gardening, library cataloging, and the science of living. Excellent health has prevailed among all the students.

An official survey of the grounds of the institution was made, which showed the area to be approximately 103 acres.

At the close of the term 4 normal students received the degree of master of arts, 17 that of bachelor of arts, 2 the degree of bachelor of philosophy, and 1 the degree of bachelor of laws. A normal certificate was issued to 1 normal student. Graduates of the higher departments of the institution are largely engaged in teaching, farming, and business, and have been almost universally successful.

As has heretofore been said in annual reports of the Department, the only duty devolved on the Secretary in relation to the institution is the reception of the annual report thereof and the admission of indigent deaf mutes from the several States and Territories for instruction in the collegiate branch thereof.

In my last annual report I recommended that the entire control and management of the institution for the deaf be vested in the president and board of directors, and that they be required to report direct to Congress as to the administration of the institution. This recommendation is renewed.

MARYLAND SCHOOL FOR THE BLIND.

Section 2 of the act of Congress approved May 29, 1858 (11 Stat., 294), authorizes the Secretary of the Interior to place for instruction in an institution for the blind, in the State of Maryland or some other State, the indigent blind children of teachable age who are children of persons actually engaged in the military and naval services of the United States. No permits for this class of beneficiaries were issued during the past year.

SUPERINTENDENT OF THE UNITED STATES CAPITOL BUILDING AND GROUNDS.

The Superintendent of the United States Capitol Building and Grounds, in his annual report of the operations of his office, specifies in detail the various improvements, changes, and repairs made to the Capitol and other buildings under his supervision.

In the Capitol, among other repairs and improvements, there have been installed in the kitchens of the Senate and House restaurants two refrigerating machines, with the attendant repairs to ice boxes

and changes needed to equip a refrigerating plant adapted for the purposes of the service required. The House restaurant has been completely remodeled, and the customary repairs made in committee rooms, corridors, and other portions of the Capitol, including necessary attention to the questions of heating, ventilation, and sanitation.

Work on the Capitol Grounds included the formation of a new park area in the large court of the Senate Office Building and the installation of a central fountain. The work of tree pruning and surgery has resulted in saving many historic trees, and the planting of new trees has been made an important feature of this work. The walks and drives have been repaired and careful attention given to the care of small shrubs injured by the severe winter of the last season.

In the engine house and Senate and House stables such attention was given to plumbing, painting, repairs to stalls, etc., usually required in buildings of this class whose occupancy extends over a long period.

Repairs at the United States courthouse included painting, plastering, concrete and brick work, plumbing, and the installation of new fixtures in closets and lavatories where such changes have been needed. At the Botanic Garden changes in the heating plant by the installation of new boilers and changes in old boilers have been made. The plant houses have been repaired and necessary glazing and painting attended to.

During the fiscal year ended June 30, 1912, the expenditures under various appropriations have been as follows: Capitol Building and repairs, \$33,500; improving Capitol grounds, \$37,000; Capitol power plant, \$90,000; engine house and Senate and House stables, \$1,500; and repairs to courthouse, District of Columbia, \$10,000.

GENERAL EDUCATION BOARD.

This corporation was created by the act of Congress approved January 12, 1903, section 6 of which requires the corporation to file annually with the Secretary of the Interior a report in writing stating in detail the property, real and personal, held by the corporation, and the expenditure or other use or disposition of the same, or the income thereof during the preceding year. It has for its object the promotion of education within the United States. The corporation owns no real estate, its property consisting of securities and money divided into various funds, according to the purpose for which it is to be used.

On June 30, 1912, the capital funds belonging without restriction to the board amounted to \$31,994,437.58, invested as follows: Bonds, \$15,735,423.28; stocks, \$16,103,636.18.

The income from the above funds, together with the income from undisbursed income, including income earned but not received, amounted during the year to \$1,902,280.81, from which was deducted a loss of \$2,853.65 occasioned by the sale of securities representing invested income, leaving a net amount of \$1,899,427.16. The balance of income from previous years as of June 30, 1911, amounting to \$4,212,721.81, increased the total to \$6,112,148.97.

Disbursements from income during the year were as follows:

Payments on account of appropriations to colleges, universities, etc.....	\$1, 018, 870. 83
Payments on account of appropriations for farmers' cooperative demonstration work carried on by the United States Department of Agriculture.....	121, 798. 54
Payments made on account of appropriations for salaries and expenses of professors of secondary education in Southern States.....	30, 356. 59
Payments made on account of appropriations for salaries and expenses of Negro rural school supervisors.....	4, 000. 00
Expenses	33, 320. 38
Total.....	1, 208, 346. 14

This leaves an undisbursed balance of income on June 30, 1912, of \$4,903,802.83. It is invested as follows: Bonds, \$3,315,750.44; stocks, \$944,228.49; income receivable, \$248,409.40; accounts receivable, \$2,177.95; cash, \$393,236.55. It should be noted, however, that against this balance there are unpaid appropriations amounting to \$4,661,178. 26.

The John D. Rockefeller special fund is a fund which Mr. Rockefeller controls both as to principal and income. In a previous report a gift to the University of Chicago of \$9,912,540.74 was published. One-tenth of this gift (or securities and cash representing it), is payable each year. The income from the unpaid balance, however, remains the property of the board subject to Mr. Rockefeller's direction. This accounts for the disparity between the balance of the John D. Rockefeller special fund and the income account of the same name. On June 30, 1912, the principal fund amounted to \$1,002,150.25, invested as follows: Bonds, \$930,622.50; stocks, \$68,633.32; cash, \$2,894.43. No gifts were made from this fund during year. The income earned during the year was \$486,872.57, the balance from previous years (\$718,569.91) increasing the amount to \$1,205,442.48. Disbursements during the year were as follows:

Gifts to the Rockefeller Institute for Medical Research.....	\$222, 283. 65
Gifts to the University of Chicago.....	20, 000. 00
Expenses	1, 533. 20
Total.....	243, 816. 85

This leaves a balance of \$961,625.63, which is invested as follows: Bonds, \$583,234.39; stocks, \$147,970.20; income receivable, \$94,637.29; cash, \$135,783.75.

The Anna T. Jeanes fund, the income to be used for Negro rural schools, still amounts to \$200,000. It is invested as follows: Bonds, \$182,877.51; stocks, \$16,645; cash, \$477.49.

The income from this fund during the year was \$9,240.99. Added to the balance from the previous year, the total available income amounted to \$14,363.25. Of this \$4,540 was appropriated and paid to various schools and \$40.72 paid out for expenses, leaving a balance of \$9,782.53, all in cash.

MEMORIAL TO JOHN WESLEY POWELL.

The sundry civil act approved March 4, 1909 (35 Stat., 992), appropriated \$5,000 for the purpose of procuring and erecting on the brink of the Grand Canyon, in the Grand Canyon Forest Reserve in Arizona, a memorial to the late John Wesley Powell, in recognition of his distinguished public services as a soldier, explorer, and administrator of Government scientific work, and providing that the design for the memorial and the site should be approved by the Secretary of the Interior. As stated in my last annual report, an advisory committee was designated, consisting of Dr. W. H. Holmes, chief of the Bureau of Ethnology, Dr. C. D. Walcott, secretary of the Smithsonian Institution, and Col. H. C. Rizer, chief clerk of the United States Geological Survey, to assist the Secretary of the Interior in determining the character of the monument and the selection of the best site. This committee has submitted a tentative design for the monument, prepared by Mr. J. R. Marshall, and upon consideration thereof the whole matter was referred to the Fine Arts Commission for an expression of its views as to the suitability of the design in question. The commission has approved certain features of the design, but is withholding final report for further consideration.

MARITIME CANAL COMPANY OF NICARAGUA.

Section 6 of the act of Congress approved February 20, 1889, entitled "An act to incorporate the Maritime Canal Company of Nicaragua" (25 Stat., 675), provides:

Said company shall make a report on the first Monday of December in each year to the Secretary of the Interior, which shall be duly verified on oath by the president and secretary thereof, giving such detailed statement of its affairs, and of its assets and liabilities, as may be required by the Secretary of the Interior, and any wilfully false statement so made shall be deemed perjury, and punishable as such. And it shall be the duty of the Secretary of the Interior to require such annual statement and to prescribe the form thereof and the particulars to be given thereby:

The report of this corporation has been duly transmitted to Congress. In view of the fact, however, that the Maritime Canal Co. of Nicaragua has no relations whatever with this Department and the Secretary has no duty to perform thereto, except as specified in the above-mentioned law, the recommendation contained in my last annual report, that the act be so amended as to require the corporation to submit directly to Congress such form of report as it may prescribe, is renewed.

Very respectfully,

WALTER L. FISHER,
Secretary.

The PRESIDENT.

64213°—INT 1912—VOL 1—7

APPENDICES.

APPENDIX A.

Land classification with progress of coal classification and valuation.

STATUS ON JULY 1, 1911.

State.	Withdrawals outstanding.	Coal lands classified.	Valuation.	Valuation at minimum price.
	<i>Acres.</i> (¹)	<i>Acres.</i>		
Alaska.....	.....	.....	.....	.....
Arkansas.....	118,718	60,715	\$1,473,762	\$1,214,280
Arizona.....	239,903	7,720	585,086	154,404
California.....	5,517,338	2,873,929	167,775,104	50,309,589
Colorado.....	6,985,417	.....	.....	.....
Idaho.....	19,890,471	3,512,348	94,463,647	76,398,380
Montana.....	92,141	.....	.....	.....
Nevada.....	5,809,490	954,214	21,261,664	13,523,792
New Mexico.....	18,454,490	230,814	4,582,860	4,582,860
North Dakota.....	3,521	1,897	49,909	37,919
Oregon.....	2,375,263	.....	.....	.....
South Dakota.....	6,221,314	636,479	36,576,849	8,287,783
Utah.....	2,210,507	40	2,000	800
Washington.....	7,013,543	7,147,719	381,804,858	109,933,717
Wyoming.....	.....	.....	.....	.....
Total.....	74,932,416	15,425,875	708,575,739	264,443,524

STATUS ON JULY 1, 1912.

Alaska.....	(¹)	.....	.....	.....
Arkansas.....	.....	60,715	\$1,473,762	\$1,214,280
Arizona.....	118,718	.....	.....	.....
California.....	239,903	7,720	585,086	154,404
Colorado.....	8,245,063	2,880,215	168,374,600	50,435,809
Idaho.....	1,566,918	.....	.....	.....
Montana.....	17,642,291	4,171,995	105,320,836	86,507,003
Nevada.....	92,141	.....	.....	.....
New Mexico.....	5,750,440	954,052	21,280,162	13,520,352
North Dakota.....	18,454,410	230,814	4,584,255	4,584,255
Oregon.....	3,521	1,897	49,909	37,919
South Dakota.....	866,909	82,217	831,270	831,270
Utah.....	6,364,783	670,306	38,323,592	8,678,513
Washington.....	2,206,190	40	2,000	800
Wyoming.....	6,664,302	7,179,474	382,221,890	110,432,145
Total.....	68,215,489	16,239,445	723,047,362	276,396,260

STATUS ON DECEMBER 1, 1912.

Alaska.....	(¹)	.....	.....	.....
Arkansas.....	.....	60,715	\$1,473,762	\$1,214,280
Arizona.....	118,718	.....	.....	.....
California.....	239,903	7,720	585,086	154,404
Colorado.....	7,493,290	2,884,080	168,457,586	50,512,600
Idaho.....	1,566,918	.....	.....	.....
Montana.....	17,441,128	4,171,995	105,320,836	86,507,003
Nevada.....	92,141	800	16,000	16,000
New Mexico.....	5,739,367	954,052	21,280,162	13,520,352
North Dakota.....	17,343,456	1,448,978	24,145,545	24,145,545
Oregon.....	26,581	1,897	49,909	37,919
South Dakota.....	610,754	82,217	831,270	831,270
Utah.....	6,364,623	670,306	38,323,592	8,678,513
Washington.....	2,206,150	40	2,000	800
Wyoming.....	6,666,703	7,177,269	382,122,501	110,388,045
Total.....	65,909,712	17,460,069	742,638,249	296,008,740

¹ Area unknown.

Oil-land withdrawals and restorations.

State.	Withdrawals outstanding July 1, 1911.	Fiscal year ended June 30, 1912.		Withdrawals outstanding July 1, 1912.	Period July 1, 1912, to Dec. 1, 1912.		Withdrawals outstanding Dec. 1, 1912.
		New withdrawals.	Restorations.		New withdrawals.	Restorations.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	230,400			230,400			230,400
California.....	1,592,704	23,947	640	1,616,011		133,626	1,482,385
Colorado.....	87,474			87,474			87,474
Louisiana.....	414,720			414,720			414,720
New Mexico.....	419,901		419,901				
Oregon.....	74,849			74,849			74,849
Utah.....	581,566	1,370,760		1,952,326			1,952,326
Wyoming.....	568,815		170,413	398,402	36,746		435,148
Total.....	3,970,429	1,394,707	590,954	4,774,182	36,746	133,626	4,677,302

Petroleum Naval Reserve No. 1, California No. 1, approved by President September 2, 1912, involved 32,068 acres included in outstanding oil reserves.

Phosphate land withdrawals and restorations.

State.	Withdrawals outstanding July 1, 1911.	Fiscal year ended June 30, 1912.		Withdrawals outstanding July 1, 1912.	Period July 1, 1912, to Dec. 1, 1912.		Withdrawals outstanding Dec. 1, 1912.
		New withdrawals.	Restorations.		New withdrawals.	Restorations.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Florida.....	37,839		2,199	35,640			43,780
Idaho.....	952,388	354,717	249,049	1,058,056	8,140		1,058,056
Montana.....	33,950	240,911		274,861			274,861
Utah.....	107,745			107,745			107,745
Wyoming.....	1,267,494	597,591	826	1,864,259	10,393	67,557	1,907,086
Total.....	2,399,416	1,193,219	252,074	3,340,561	18,523	67,557	3,291,527

Power-site reserves.

State.	Withdrawals outstanding July 1, 1911.	Fiscal year ended June 30, 1912.		Withdrawals outstanding July 1, 1912.	Period July 1, 1912, to Dec. 1, 1912.		Withdrawals outstanding Dec. 1, 1912.
		New withdrawals.	Restorations.		Withdrawals.	Restorations.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	213,390	3,019	23,448	192,961		5,730	187,231
California.....	53,689	115,383	4,064	165,008	34,453	3,750	195,711
Colorado.....	209,174	39,278	3,799	244,653			244,653
Idaho.....	229,692	72,432	6,667	295,457	15,302	19,774	290,985
Minnesota.....	8,388	2,866		11,254			11,254
Montana.....	127,687	31,097	7,678	151,106	83	1,500	149,689
Nevada.....	15,375		80	15,295			15,295
New Mexico.....	9,706	4,830		14,536		959	13,577
Oregon.....	161,795	24,367	1,919	184,243	9,684	110	193,817
Utah.....	347,252	27,778		375,030			375,030
Washington.....	80,386	29,734	6,979	103,141	2,787	7,075	98,553
Wyoming.....	58,889	2,680	480	61,069	22	5,245	55,846
Total.....	1,515,423	353,444	55,114	1,813,753	62,331	44,143	1,831,941

Public water reserves.

State.	With- drawals outstand- ing July 1, 1911.	Fiscal year ended June 30, 1912.		With- drawals outstand- ing July 1, 1912.	Period July 1, 1912, to Dec. 1, 1912.		With- drawals out- standing Dec. 1, 1912.
		New with- drawals.	Restora- tions.		New with- drawals.	Restora- tions.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Utah.....	23,143	23,143	62,979	23,143	62,979	23,143	62,979
Wyoming.....	86,122	86,122	86,122	86,122	86,122	86,122	86,122
Total.....	86,122	86,122	86,122	86,122	86,122	86,122	86,122

Enlarged homestead designations.

State.	Acreage designated July 1, 1911.	Fiscal year July 1, 1911, to June 30, 1912.		Acreage designated July 1, 1912.	Period July 1, 1912, to Nov. 30, 1912.		Acreage designated Dec. 1, 1912
		Designa- tions.	Cancel- lations.		Designa- tions.	Cancel- lations.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	26,959,917	389,320	19,458	26,959,779	26,959,779	26,959,779	26,959,779
Colorado.....	20,354,509	11,027	.....	20,365,536	20,365,536	20,365,536	20,365,536
Idaho:							
Sections 1-5 only.....	5,336,838	91,731	3,941	5,424,628	160	.....	5,424,788
Section 6.....	3,841	5,723	1,763	7,801	.....	.....	7,801
Total.....	5,340,679	97,454	5,704	5,432,429	.....	.....	5,432,589
Montana.....	31,853,530	175,566	320	32,028,776	3,280	646	32,031,410
Nevada.....	49,512,960	.....	.....	49,512,960	.....	.....	49,512,960
New Mexico.....	16,306,676	136,977	.....	16,443,652	1,462,042	.....	17,905,694
Oregon.....	11,213,661	144,227	.....	11,357,888	18,447	.....	11,376,335
Utah:							
Sections 1-5 only.....	6,765,780	177,891	.....	6,943,671	3,232	4,552	6,942,351
Section 6.....	1,374,947	16,380	189,727	1,201,800	10,224	160	1,211,664
Total.....	8,140,727	194,271	.....	8,145,271	13,456	4,712	8,154,015
Washington.....	3,402,896	.....	.....	3,402,896	.....	.....	3,402,896
Wyoming.....	17,538,941	52,671	3,639	17,587,973	2,825	.....	17,590,798
Total.....	190,254,495	1,201,513	218,848	191,237,160	1,500,210	5,358	192,732,012

¹ Due to redesignation from sections 1-5 only to section 6.² Transferred from section 6 to sections 1-5 only.*Mineral-land withdrawal.*

State.	With- drawals outstanding July 1, 1911.	Fiscal year ended June 30, 1912.		With- drawals outstand- ing July 1, 1912.	Period July 1, 1912, to Dec. 1, 1912.		With- drawals outstand- ing Dec. 1, 1912.
		New with- drawals.	Restora- tions.		New with- drawals.	Restora- tions.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	.....	.....	.....	.....	9,787	.....	9,787

Metalliferous classifications.

[Northern Pacific R. R. grant lands, Idaho and Montana.]

	Classified prior to July 1, 1911.	Classified during fiscal year 1911-12.	Classified June 20, 1912.	Classified during period end- ed Dec. 1, 1912.	Classified Dec. 1, 1912.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Mineral.....	176,031	20,278	196,809	18,960	215,269
Nonmineral.....	112,514	137,036	249,550	53,034	903,584
Total.....	288,545	157,314	446,359	71,994	517,823

APPENDIX B.

National Park Statistics.

Appropriations and revenues of national parks for the fiscal years 1906-1912.

	Appropriation.	Revenue.	Total.
Yellowstone National Park:			
1906.....	\$7,500.00	\$1,522.50	
1907.....	7,500.00	2,808.96	
1908.....	8,000.00	4,699.65	
1909.....	8,000.00	4,790.20	
1910.....	8,000.00	18,188.82	
1911.....	8,500.00	23,420.13	
1912.....	8,500.00	16,476.38	
	56,000.00	71,906.64	\$127,906.64
Yosemite National Park			
1906.....	5,400.00	1,000.00	
1907.....	5,750.00	9,193.04	
1908.....	30,000.00	14,390.06	
1909.....	30,000.00	16,051.17	
1910.....	30,000.00	21,373.18	
1911.....	62,000.00	35,765.48	
1912.....	50,000.00	23,856.77	
	213,150.00	121,628.70	334,778.70
Sequoia National Park:			
1906.....	10,000.00		
1907.....	10,000.00	159.50	
1908.....	15,550.00	43.15	
1909.....	15,550.00	46.57	
1910.....	15,550.00	121.78	
1911.....	15,550.00	255.65	
1912.....	15,550.00	305.16	
	97,750.00	931.81	98,681.81
General Grant National Park:			
1906.....	2,000.00		
1907.....	2,000.00		
1908.....	2,000.00	63.75	
1909.....	2,000.00		
1910.....	2,000.00	50.00	
1911.....	2,000.00	324.39	
1912.....	2,000.00	173.54	
	14,000.00	611.68	14,611.68
Crater Lake National Park:			
1906.....	3,000.00		
1907-8.....	7,315.00	25.00	
1909.....	3,000.00		
1910.....	3,000.00	11.00	
1911.....	3,000.00	30.00	
1912.....	3,000.00	323.00	
	22,315.00	389.00	22,704.00

Appropriations and revenues of national parks for the fiscal years 1906-1912—
Continued.

	Appropriation.	Revenues.	Total.
Mesa Verde National Park:			
1907-8.....	\$7,500.00		
1908.....	7,500.00		
1909.....	7,500.00		
1910.....	20,000.00	\$100.00	
1911.....	7,500.00	898.62	
	50,000.00	998.62	\$50,998.62
Mount Rainier National Park:			
1907.....	2,500.00	205.22	
1908.....	3,000.00	170.00	
1909.....	3,000.00	1,104.79	
1910.....	3,000.00	8,963.79	
1911.....	3,000.00	7,748.48	
1912.....	5,400.00	5,370.26	
	19,900.00	23,552.64	43,452.64
Wind Cave National Park:			
1906.....	2,500.00		
1907.....	4,400.00		
1908.....	2,500.00	300.00	
1909.....	2,500.00		
1910.....	2,500.00	340.75	
1911.....	2,500.00	340.00	
1912.....	2,500.00	675.00	
	19,400.00	1,555.75	20,955.75
Platt National Park:			
1906.....		37,307.44	
1907.....		178.00	
1908.....		7,021.00	
1909.....		272.06	
1910.....		2,130.31	
1911.....	5,000.00	422.75	
1912.....	10,000.00	165.50	
	15,000.00	47,497.00	62,497.00
Glacier National Park:			
1911.....	15,000.00	326.88	
1912.....	69,200.00	1,490.94	
	84,200.00	1,817.82	86,017.82

¹ Carried to the credit of "Miscellaneous receipts" in the Treasury.

Total appropriations.....	\$591,715.00
Total revenues.....	270,889.66
Total.....	862,604.66

Visitors to national parks, 1906 to 1912.

Name of park.	1906	1907	1908	1909	1910	1911	1912
Yellowstone National Park.....	17,182	16,414	19,542	32,545	19,575	23,054	22,970
Yosemite National Park.....	5,414	7,102	8,850	13,182	13,619	12,530	10,884
Sequoia National Park.....	700	900	1,261	854	2,407	3,114	2,923
General Grant National Park.....	900	1,100	1,773	798	1,178	2,160	2,240
Mount Rainier National Park.....	1,786	2,068	3,511	5,968	8,000	10,306	8,946
Mesa Verde National Park.....	(¹)	(¹)	80	165	250	206	230
Crater Lake National Park.....	1,800	2,600	5,275	4,171	5,000	² 4,500	5,235
Wind Cave National Park.....	2,887	2,751	3,171	3,216	3,387	3,887	3,199
Platt National Park.....	(¹)	28,000	26,000	25,000	² 25,000	30,000	² 31,000
Sullys Hill National Park.....	(¹)	400	250	190	190	² 200	² 200
Hot Springs Reservation.....	(¹)	(¹)	(¹)	(¹)	120,000	130,000	135,000
Glacier National Park.....						² 4,000	6,257

¹ No record kept.

² Estimate.

Location, area, and characteristics of national parks.

Name	Location.	When established.	Area (acres).	Private lands (acres).	Visitors, 1912.	Special characteristics.
Yellowstone.....	Wyoming, Montana, and Idaho.	Mar. 1, 1872	2,142,720	None.	22,970	Wonderful scenery, geysers, boiling springs, mud volcanoes and springs, mountains, grand waterfalls, brilliant-hued canyons, great lake 8,000 feet above the level of the sea; wild animals.
Yosemite.....	California.....	Oct. 1, 1890	719,622	19,827	10,884	Mountain scenery, magnificent waterfalls, the Hetch Hetchy and Yosemite Valley, ice-sculptured canyons, glacier lakes, forests.
Sequoia.....	do.....	Sept. 25, 1890	161,597	3,718.96	2,923	(The home of the "Big Tree," (<i>Sequoia gigantea</i>), growing to a height of 300 feet with a diameter of 20 feet, the bark being 2 feet thick; rugged and picturesque scenery, beautiful cascades and falls and wonderful caves.
General Grant.....	do.....	Oct. 1, 1890	2,536	160	2,240	Glaciers and wild mountain scenery.
Mount Rainier.....	Washington.....	Mar. 2, 1899	207,360	18.2	8,946	Rugged mountain scenery, beautiful lake within the crater of an extinct volcano, etc.
Crater Lake.....	Oregon.....	May 22, 1902	159,360	2,458.11	5,235	Well known for a cavern having many miles of galleries and numerous chambers of considerable size containing many peculiar formations.
Wind Cave.....	South Dakota.....	Jan. 9, 1903	10,522	160	3,199	(Noted for its bromide and other springs; the waters of which have medicinal qualities; park well wooded, scenery picturesque.)
Platt.....	Oklahoma.....	July 1, 1902 (Apr. 21, 1904	848.22	None.	31,000	(Set aside to preserve the prehistoric ruins of an ancient people; rugged scenery.)
Mesa Verde.....	Colorado.....	June 29, 1906	42,376	880	230	Famous for its thermal springs, having wonderful medicinal qualities.
5-mile strip for protection of ruins.....	do.....	do.....	175,360	.....	.....	Famed for its beautiful lakes derived from glaciers, lofty mountains clad with forests, magnificent glacial formations, num-berless waterfalls. Game, fish, and birds abound.
Hot Springs Reservation.....	Arkansas.....	June 16, 1880	911.63	None.	135,000	Small rugged hills containing prehistoric ruins. Practically a local park.
Glacier.....	Montana.....	May 11, 1910	981,631	16,668.11	6,257	These ruins are one of the most noteworthy relics of a prehistoric age and people within the limits of the United States. Dis-covered in ruinous condition in 1894.
Sullys Hill.....	North Dakota.....	Apr. 27, 1904	780	None.	1200	
Casa Grande Ruins.....	Arizona.....	Mar. 2, 1889	480	None.	450	

: Estimated.

**REPORT OF THE COMMISSIONER OF THE GENERAL
LAND OFFICE.**

105

REPORT OF THE COMMISSIONER OF THE GENERAL LAND OFFICE

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,

Washington, D. C., October 1, 1912.

SIR: The following report of the work in the General Land Office for the fiscal year ended June 30, 1912, and recommendations for change in legislation are respectfully submitted:

CENTENNIAL.

The year 1912 was the centennial year of the creation of the General Land Office as a separate bureau. Prior to the time of its creation, duties similar to those which were placed by statute upon the newly-created office of commissioner were performed by an officer designated as surveyor general. The disposition of the public lands being under a system of sale, the jurisdiction naturally fell to the Secretary of the Treasury. The surveyor general's office was therefore in the Treasury Department.

When the position of commissioner was created by the act of April 25, 1812, the bureau thus coming into existence was still retained under the jurisdiction of the Treasury Department, remaining there until March 3, 1849, when it became a part of the Interior Department. The first Commissioner of the General Land Office, Edward Tiffen, of Ohio, took the office on May 7, 1812, and on May 7, 1912, the centennial was celebrated by the holding of suitable ceremonies in Continental Hall, permission being kindly granted for that purpose by the Daughters of the American Revolution.

Under the organization of the General Land Office as a separate bureau in 1812, the following force was employed in Washington: Commissioner, chief clerk, draftsman, general clerk, and 6 junior clerks. There were at that time 19 local land offices, and 1 office of surveyor general.

On June 30, 1912, there were in this bureau, in the field, and in Washington, employees classified as follows:

In General Land Office, Washington, D. C.....	532
In 13 offices of surveyor general.....	174
In 102 district land offices.....	414
In the field service.....	180
In the surveying service.....	102
In Chippewa logging service.....	17
Total	1, 419

GENERAL STATEMENT.

The number of patents written last year was 67,475, as against 72,189 for the prior year. This is somewhat less than the number written for the prior year, not due to less work being performed in the office, but because there were less patents to be written. The work of the office is up to date with very few minor exceptions. In homestead cases patents are being written within four months from the date of proof. It would not be advisable to shorten this intervening length of time; some period should be allowed so that fraud, if it exists, may be found.

The correspondence of the office shows that there were received last year 362,916 letters, of which 254,842 were answered by letter, circulars being sent to the remainder.

CASH RECEIPTS AND EXPENDITURES.

The total cash receipts from the sale of public lands, including fees and commissions on both original and final entries, for the fiscal year 1912 were \$6,671,718.54. Miscellaneous receipts were as follows: From sales of Indian lands \$2,284,538.37; reclamation water-rights charges, \$914,542.31; sales of timber in Alaska, depredations on public lands, sales of Government property, and copies of records and plats, \$102,248.78, making the aggregate total of cash receipts of this bureau during the fiscal year 1912, \$9,973,048, a decrease of \$1,116,879.60, as compared with those for the fiscal year ended June 30, 1911.

The total expenses of district land offices for salaries and commissions of registers and receivers, incidental expenses, and expenses of depositing public moneys during the fiscal year ended June 30, 1912, were \$850,121.04, a decrease of \$20,120.96. The aggregate expenditures and estimated liabilities of the public-land service, including expenses of district land offices and surveys, were \$3,573,692.88, leaving a net surplus of \$6,399,355.12.

AREA OF LAND ENTERED AND PATENTED.

The total area of public and Indian land originally entered during the fiscal year ended June 30, 1912, is 14,574,688.82 acres, a decrease of 3,064,410.72 acres as compared with the area entered during the year 1911.

The area patented during the fiscal year is 10,135,475 acres, a decrease of 2,137,020 acres as compared with the fiscal year 1911. Of the above area 5,011,948 acres were patented under the homestead law.

ORGANIZATION.

In the report for the fiscal year ended June 30, 1911, the system of organization of the General Land Office was extensively discussed,

the duties performed by its officers set forth, and a change in the organization recommended. Several bills were introduced in Congress along the lines of the suggested reorganization. None of them, however, have received favorable action. Attention is called to the recommendations in the last report, and it is hoped that Congress may see fit to reorganize this office so as to give it more suitable machinery for the performance of the duties before it.

SALARIES.

Attention is again called to the fact that the salaries which are paid to the higher employees of this office are inadequate. Congress has increased the salary of the chief clerk in the legislative bill for the fiscal year ending June 30, 1913. It has, however, decreased the salary of the Chief of Division of Surveys from \$2,750 to \$2,400. This is very much to be regretted. The duties of the Chief of Division of Surveys under its present organization are extremely important, and the work is such that it merits a salary of at least \$2,750 as compensation for the man who performs it.

The law graduates in this office have increased in number, so that there are now 140 graduate lawyers among the employees. Many more of the employees are taking law courses or studying geology in order to better fit them for handling the work of the office. Their efforts should be rewarded by a general readjustment of the salaries paid in this office, so as to pay a more adequate salary for the responsible positions therein.

PENSIONS.

After a long experience in governmental matters comprising, amongst other services, that of one year as Assistant Commissioner and over four years as Commissioner of the General Land Office, I have come to the conclusion that some system of pensioning should be adopted by the United States Government. The importance of the work performed in Washington is increasing every year. It has ceased to be merely clerical. The duties which Congress has placed from time to time upon the executive departments have become more and more supervisory in their character. The element of trusteeship is recognized, and trusteeship seems to be passing into guardianship. The general public naturally look to the executive head of an office and hold him responsible for the proper performance of the duties that are imposed upon the bureau or department of which he is in charge. This attitude is reasonable. It is not to be supposed that the general public can appreciate the fact that the great details of the work of a bureau must be carried out by its employees, the head being restricted to the general management and to a personal touch

with the most important cases, generally those which establish a precedent or possess some features to which his attention must be called.

With this increasing importance of the work and the seeming demand from all parts of the country that it shall become wider in its scope, there is a great necessity that the service be so organized as to attract men of the highest qualification. There is no question that the general entrance salary paid to employees for the ordinary kind of clerical work is ample, and compares favorably with that paid by private concerns to their new employees for work of a similar character. As against this, however, there are not the same opportunities in the Government service for the ultimate obtaining of large salaries as in private employment. No one disputes the fact that these coveted positions in private life are secured by only a few, and that a large per cent of workers do not rise above a mediocre salary, but those few are the very men whom the Government ought to secure; under present conditions they are not attracted to Government service. This is not because the work is not big and does not present endless opportunities for the best efforts of men of a high degree of constructive ability. It is because after youth and middle age devoted to the public service there is nothing for a man to look forward to except old age and hard work at probably a reduced salary or a prospect of being dropped without any probability of securing another position.

This is not the case in the Army; it is not the case in the Navy. Both of these services attract young men of vigor and strong mental capacity, partly, of course, on account of the glamor which surrounds the military and naval service, and the patriotic feeling that one's country may demand the highest sacrifice—and this appeals to many strong natures—but also because of the fact that the military and naval services provide a competent living for a man during the vigor of his years and an adequate pension for him in his declining days.

No one who has followed the history of civil government during the last decade can fail to appreciate the fact that there is as great a field for the honest service of the level-headed, sober-minded man of character in the civil branches of the Government as there is in the military. The fact that there is but small opportunity for the ordinary Governmental employee to receive the award of popular applause should not detract from the value of the services which he performs, but rather enhance them, as he is deprived from the very nature of his work of one reward which so many men covet.

By the adoption of a pension system there is no doubt but that the very highest type of men would be attracted to service in the Government, and the general standard raised above even that of to-day.

CORRESPONDENCE.

One of the most important duties imposed upon the General Land Office is that of answering correspondents who address inquiries to the office, either with respect to the status of their own claims or to secure information in regard to the public-land laws. A failure on the part of the office to promptly respond in the one case may entail serious consequence to the writer—and later serve to embarrass the service in its disposition of the case—while in the other it is a condition which should not exist in any well-conducted office. Heretofore the matter of handling general correspondence has been given much consideration and many methods have been devised by which promptness and certainty in response could be secured, but in any methods heretofore adopted the results have not been entirely satisfactory. Just prior to the commencement of the last fiscal year a correspondence section in the public lands division was organized and put into operation. This section is in charge of a competent and skilled examiner under whose direction a corps of clerks are engaged exclusively in handling general correspondence. Under this system the period of time allotted for response to a letter is four days from its receipt. This involves the indexing of the letter, its assignment to the correspondence section by proper card, the examination in many instances of records in the office, and the preparation of the answer, its signature, press copying, and mailing. This period of time is regarded as short as the necessities of the work will permit. In answering letters inquiring for the status of cases it is, of course, highly important that all statements should be made most carefully after an examination of the record, in order that the response may be accurate and parties correctly informed as to the situation of the cases.

During the past fiscal year this section has written 49,366 letters, which includes applications for certified copies of the records, but does not include responses by circulars nor official letters written to registers and receivers. It should not be understood that all inquiries for information addressed to the office are referred to this section for response. In many cases the preparation of the answer requires specific knowledge and technical information which could only be expected in the division where the case is under consideration. However, it may be said that with experience the scope of correspondence now confided to this section is constantly extending, so that as time goes on it will answer more and more of the general correspondence. The work of this section has passed outside of the experimental period and entered upon a broader field of development. This conclusion is justified not only from observations of the results obtained in the office itself, but from the many commendatory letters the office is constantly receiving from our correspondents.

FORMULATION OF CHARGES.

There is another important change which was made during the latter part of the last fiscal year.

The work of the office is diversified, and in order that it may be properly carried out it has always been divided into different classes, and separate divisions created, work of a certain character being allotted to each one. While this is essential to the perfection of the work of the office, yet any decision or letter which was written concerning the case is signed by the commissioner or the assistant commissioner, and therefore is an office letter and not a division decision. Under this necessary organization it can be easily seen that constant care has to be taken to prevent the work being considered as division work and not work of the office.

An allegation of facts comprising a noncompliance with the law leads to the setting of a case for hearing. After the determination of these charges in the past there have been raised questions of non-compliance with the technical requirements of the law; not touched upon in the hearing or advanced in the charge leading thereto, the questions then raised generally touching upon fraud. The result has been that in a certain class of cases after hearing had and decision rendered in favor of the defendant, it is found upon a close examination of the papers in the division having ultimate jurisdiction, that there are points of non-compliance with the requirements of the law, which do not possess fraud features, which were not presented at the hearing had. As a result the claimant, after having fought his case on the charges made, was confronted with new defects which he is called upon to cure. This procedure was erroneous, and a change has been made. Now, prior to the setting of the case for hearing, the papers are examined and considered by the division having jurisdiction over the proof itself, and all matters which stand in the way of the issuance of patent are advanced at one and the same time. It is hoped that the institution of this procedure, and the correction of the erroneous steps which have heretofore been taken, will cure the complaint which has been found to exist: That, after hearing had, the office advances further complaints and seems to have assumed the attitude of endeavoring to block progress by constantly finding new faults.

AGENTS' REPORTS NOT CONSIDERED IN ADJUDICATING CASES WHERE TRIAL HAD.

During the past year steps have been taken to completely segregate the reports of special agents made on any cases upon which hearing has been had. In no instance is a report of an agent allowed to be placed with the testimony and evidence taken in a case. The adjudicating lawyer is permitted to see the testimony only, and he must

make up his mind on the merits of the case as presented at the hearing. It has never been the idea of this office that the report of an agent should have any weight in the determination of a case after trial had, and directions that the reports be not consulted were given two years ago. In the fear that the agent's report might unwittingly influence the adjudicating officer, if left with the papers and therefore accessible, it has been deemed best to see that the report is placed in a separate file and not sent down to the division having the duty of deciding the case.

FIELD SERVICE.

Herewith is submitted a comparative statement showing the results accomplished during the fiscal years 1909-10, 1910-11, and 1911-12, by the Field Service under appropriations for said fiscal years in the sums of \$1,000,000, \$750,000 and \$650,000 respectively.

Comparative statement showing results accomplished by the field service during the fiscal years 1910, 1911, and 1912.

	1909-10	1910-11	1911-12
Appropriated.....	\$1,000,000.00	\$750,000.00	\$650,000.00
Special agents.....	216	155	147
Collected.....	\$349,234.01	\$229,198.68	\$264,790.98
Acres restored.....	2,522,539.43	2,200,401.25	1,440,855.64
Entries examined and reports submitted.....	22,077	23,505	27,188
Adverse reports.....	7,814	10,022	10,086
Favorable reports.....	12,734	16,483	17,152
Civil suits recommended.....	867	580	183
Civil suits won.....	304	304	261
Civil suits lost.....	71	82	90
Indictments.....	513	236	180
Convictions.....	162	124	84
Prison sentences.....	25	47	26
Fines imposed.....	\$78,706.97	\$40,540.78	\$8,472.00
Paid.....	\$65,393.22	\$19,837.56	¹ \$12,645.00
Acquittals and dismissals.....	429	377	221

¹ Which includes payments on old cases.

Fines paid are included in total amount collected.

Alleged fraudulent entries acted on during the year in General Land Office.

	1909-10	1910-11	1911-12
Pending June 30.....	¹ 19,772	² 23,304	³ 28,100
Received.....	20,000	23,353	23,520
Approved.....	4,834	6,649	5,474
Canceled.....	4,865	4,393	4,004
Otherwise disposed of.....	7,265	7,510	22,291
Hearings ordered, General Land Office.....	6,862	8,008	2,228
Hearings ordered, Forest Service.....	366	64	23

¹ June 30, 1909.

² June 30, 1910.

³ June 30, 1911.

This comparative statement evidences, in a graphic manner, the increasing efficiency of the Field Service force. It shows, among other things, that in the fiscal year 1909-10, with an average force of 216 agents, 22,077 entries were examined and reported upon; that

in the fiscal year 1910-11, with an average force of 155 agents, 26,505 entries were examined and reported upon, and that during the fiscal year 1911-12, with an average force of only 147 agents, 27,188 entries were examined and reported upon.

The fact that this table shows that a smaller acreage was restored to the public domain during the fiscal year 1911-12, as compared with the two prior fiscal years mentioned in the table, is, of course, accounted for when it is realized that the lands that have been restored to the public domain during the past fiscal year as a result of Field Service investigations and action through the courts based upon Field Service reports, were, in general, illegally acquired or inclosed some years ago, and, of course, the acreage restored will continue to diminish as the cases pending are disposed of.

It will be observed also, that the number of civil suits recommended has diminished from 867 in the fiscal year 1909-10, to 183 recommended in the fiscal year 1911-12. This also is accounted for by the fact that old cases are being rapidly disposed of and offenses of this kind are much less common than in former years.

The heading "Alleged fraudulent entries acted on during the year in the General Land Office," for the same three fiscal years shows that on June 30, 1911, there were 28,100 cases pending in the General Land Office, while the tabulation shows that on June 30, 1912, there were only 18,921 cases pending in the office.

Attention has been invited to the few points above indicated merely for the purpose of indicating the steady growth in efficiency, not only of the Field Service force, but also of the force of the General Land Office in Washington in disposing of pending cases.

ALASKA.

It is especially desired to emphasize the excellent progress made by the Field Service in the disposition of the Alaskan coal land investigations.

During the past year very substantial progress has been made in the investigation of coal claims in the Territory of Alaska. During the open season several parties of mineral experts were placed in the field for investigating on the ground these claims to determine whether or not the legal requirements have been met as to opening or improving a mine on the claims. The special agents assigned to the Alaska field division have been engaged in the investigation, both in Alaska and in the States, of these claims to ascertain whether or not the claims were bona fide or had been located as a result of unlawful combinations or agreements. As a result of these investigations, reports have been submitted on 454 claims, and these, with the investigations previously made, make a total of 930 claims in which investigation has been completed. As there are 1,129 coal locations pending before the office there are but 199 which have not been

investigated. Of this latter number, 144 have been either canceled or held for cancellation for failure to submit applications for patent within the time required by law, so that but 55 claims remain for investigation, and it may be that only a portion of that number will require investigation, as applications for patent may not be made for some of the claims included in this number.

During the year adverse proceedings have been directed against 188 claims, which, together with those previously proceeded against, brings the total number of claims against which adverse proceedings have been instituted up to 300. Of this number, 219 are at issue on answers to charges upon which the proceedings were directed. Of the total 1,129 claims pending, 407 have been canceled and 176 held for cancellation as the result either of adverse proceedings or of the failure of the claimants to apply for patent within the statutory period.

It is expected that during the present field season all of the remaining uninvestigated cases which are ready for investigation will be examined. The efforts of the office will during the coming year be directed specifically to the trial and disposition of the cases which have been adversely and are now at issue, and it is expected that these trials will all be had during the present year.

While the investigation of the coal claims has been the principal concern of the office, yet there are other lines of work in Alaska which are demanding attention, principal among which are the investigation of timber trespasses and the investigation of applications to cut timber. The new rules and regulations relating to the latter, which were promulgated during the past year, are meeting the conditions which exist there and have resulted in much more expedition in the handling of this work. However, this line of investigation has proved embarrassing because of vast distances which must be traveled in order to look after these cases and the meager and inadequate transportation facilities afforded.

Request was made on Congress for an item of \$5,000 for the purchase of a launch to facilitate the investigation of timber trespasses in Alaska and to aid, furthermore, in the dispatch of the work done in Alaska, because of the lack of proper transportation facilities at the present time. Should Congress see fit to approve this item it is felt that much greater dispatch will be shown during the present fiscal year in the handling of all Alaskan cases now pending.

While Congress has seen fit to cut the appropriation requested for the present fiscal year from \$650,000 to \$500,000, with the result that about thirty members of the force will be eliminated, no change has been made in the allotment of agents to the Alaskan work because of this reduction in the appropriation. This is consistent because of the desire of the department to dispose of the Alaskan investigations with all possible expedition.

CALIFORNIA OIL LANDS.

Especial attention is called to the work of the field force in connection with the California oil-land investigations during the past fiscal year.

There are at present included in withdrawals in California over 1,500,000 acres of land containing many of the finest petroleum deposits in the country. Title to a considerable part of this area is still in the Government. Several suits have been brought, and others are contemplated, having for their object the recovery of title to a large part of these lands obtained through patents from which mineral lands were excluded. There are 6,000 acres of land involved in one of these suits. Of the lands withdrawn, approximately 100,000 acres are covered by about 934 pending entries and selections, comparatively few of which are for mineral title. Much of the remainder is covered by mineral locations of oil, gypsum, asphaltum, and fuller's earth placer claims. The lands are generally desert in character, with no available water supply for irrigation. By reason of the withdrawal of these lands and the conditions imposed thereby, an examination of these lands and an investigation of all entries or selections thereon are necessary in every case where title is sought. To meet these requirements a considerable number of special agents and mineral inspectors of the Field Service of the General Land Office have spent practically their entire time on this work. In some instances it has become necessary to delay work pending in other divisions in order to furnish a proper measure of cooperation on the part of our force to the Department of Justice in preparing and conducting these suits. The excellent results of this cooperation have been strongly shown, the Department of Justice having expressed itself in the highest terms of approval concerning the work done by our field agents.

It also became necessary during the past fiscal year to make a reconnoissance of about 440,000 acres of land within the withdrawals for the purpose of ascertaining the character of said lands. These examinations were in addition to the work incident to the suits referred to and were principally for use in hearings in which the Government appears as contestant or intervenor. These investigations already have been justified by the important evidence adduced and will go a long way in establishing the Government's contention with respect to said lands.

It is of course apparent that the general work of the two field divisions covering California has fallen considerably in arrears because of this demand on our men in these special investigations, and in view of the recent reduction of our appropriation by Congress in the sum of \$150,000 it will tax the ingenuity of the department to

meet these and other demands on the Field Service as a whole during the coming fiscal year. One result of the reduction in our appropriation so far has been the elimination of 26 members of the field force maintained during the past fiscal year, and it may be that other eliminations will eventually become necessary.

The immense values at stake in these oil lands are indicated to some extent by the fact that many tracts have been sold in the proven areas at a rate as high as \$2,000,000 and \$3,000,000 per section.

The reduction of the appropriation necessarily requires some readjustment in the distribution of the present field force and reductions in the present force.

Every effort has been made during the past fiscal year to dispose of old cases, especial preference being given to claims involving settlers' rights. The result is that at the present time a negligible percentage of such claims have been pending in the field for investigation for a period greater than six months.

Instructions have been issued to all chiefs of field divisions that because of the reduction of the field force they will be held to a stricter accountability for the use of the time of their men during the present fiscal year than heretofore, and in view of the remarkably increased efficiency of the force, as shown by the tabulations to which attention is called herein, there is no doubt that the work will be handled in a thorough and expeditious manner during the present fiscal year.

The office has suffered during the past fiscal year from the loss of some very valuable members of the force, who received more attractive offers in private business and therefore resigned. The force as it stands at present, however, is without doubt as creditable an administrative organization as can be found in any branch of the Government service, and its members show proper breadth of view in the many complicated problems presented to them in making field investigations. It was, of course, inevitable that when the men were younger in the service and were less confident, because of the lack of experience, some small percentage of cases arose through unnecessary technical distinctions. The attitude of the men toward their work is broad minded, and does full justice not only to the Government but also to the public-land claimant. It is gratifying to be able to record this fact in view of the constant effort of this office to have the field force conduct their investigations in a spirit of fairness to all concerned.

It is desired to express my unqualified appreciation of the enthusiastic cooperation the Field Service has received during the past fiscal year from the Department of Justice, the Geological Survey, and the Forest Service. The cooperative agreement between the General Land Office and the Geological Survey as recently modified has

given exceptional results. Before the final modification of this agreement the practice was to make a field examination and subsequently to call upon the Geological Survey for data with reference to the character of the land. The new idea is first to obtain from the Geological Survey any data it may possess and then refer the case to the field for investigation. The distinct advantage of the new system over the old is that the agent in the field has in his possession at the time that he makes his examination all of the data available to the survey, and consequently the investigation in the field, where it is necessary to all, is more comprehensive. A gratifying feature of our cooperative work in this particular is the great number of cases found upon receipt of reports from the Geological Survey not to require field investigation at all as to the character of the lands. This, of course, results in a great saving of time and expense, not only to the Government but also to public-land claimants.

COMPARATIVE STATEMENT OF METHOD OF PERFORMANCE OF WORK.

In the data submitted to Congress submitting estimates for appropriations for the Field Service for the ensuing year, a comparative statement of the manner of the performance of the work was prepared for the consideration of the committee. It is included herewith.

The following parallel columns exhibit a comparison between the old system and the present system of handing cases in this office and will indicate more graphically the additional work which devolves upon the Field Service force.

Comparison between old and present systems of handling cases.

ACT OF JUNE 4, 1897 (FOREST LIEN SELECTIONS).

Old system.	Present system.
Under the old method of procedure only a small per cent of this class of cases were examined by special agents, such cases as contained some evidence or suspicion of fraud.	At present about 75 per cent are examined by special agents because of the fraudulent character of many of this class of cases, and because of insufficient data in the Geological Survey in some cases as to the coal, oil, or power-site possibilities of the land.

SCRIP, PREEMPTION, AND TOWN-SITE CASES.

Under the old method only a very few cases belonging to these classes were examined by special agents.	At present many of those cases are examined in the field as to fraud and coal, oil, and power-site possibilities. It would be difficult to determine the exact per cent of such cases, but it will probably reach 15 or 20 per cent.
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*Comparison between old and present system of handling cases—Continued.***TIMBER AND STONE ENTRIES.****Old system.**

No appraisal made.

Present system.

Under instructions of November 30, 1908, the lands embraced in all these applications must be cruised to determine the amount and value of the timber thereon, or examined to determine the amount and value of stone thereon, as the case may be.

INSPECTION OF LOCAL LAND OFFICES.

Formerly made by special inspectors of the department.

Under present practice periodical inspections are made by members of the field force.

ISOLATED TRACTS.

Investigated only where special reasons made same desirable.

Under departmental instructions of January 19, 1912, all applications for sale must be investigated to determine the value of the land, so that the Government may receive adequate consideration therefor, and for the further purpose of preventing agreements to refrain from competitive bidding.

The work of investigation made necessary by the present policy of the department to carefully investigate projects under the so-called Carey Act, and various acts amendatory thereof, to the end that the settler who relies upon the approval of the Government may be as fully protected as possible, as well as for the purpose of minimizing the segregation of Government lands for speculative purposes, has been materially increased, not only because of the more careful and painstaking investigation of the various projects, but because of the large increase in the number of segregation lists and lists for patent predicated on such segregation lists.

*Various phases of the Carey Act.***ACT OF MARCH 15, 1910—WITHDRAWALS UNDER.****Old system.**

No examinations were made.

Present system.

Examinations are now made of all lists where it appears that such examinations are necessary or desirable. At the present time eight lists are being carefully investigated as to all phases of the cases.

Various phases of the Carey Act—Continued.

CAREY ACT SEGREGATIONS.

Old system.

Examination as to desert character of the land only by ordinary special agent or departmental inspector.

Present system.

Complete and careful engineer's report, comprising—

1. Desert or nondesert character of the land.
2. Sufficiency of the water supply, including full abstract of prior appropriations, stream measurements, if any, precipitation records and run-off, area of watershed, and all other pertinent features.
3. Feasibility of the system, including full and careful description of the proposed works, specifications of dams, canals, laterals, etc., suggestions and recommendations, etc.
4. Financial responsibility of the proposing contractors with the States. This examination is as full and careful as may be, to the end that speculative and "wild-cat" segregations be reduced to a minimum.
5. Any other information touching upon the project or its bona fides.

CAREY ACT LISTS FOR PATENT UPON ALLEGED RECLAMATION OF THE LAND.

No investigation was made, the certificate of the State engineer that the land was reclaimed being deemed sufficient.

1. Where the segregation list upon which the list for patent is predicated has not been investigated under the present system, the engineer is expected to investigate and report upon the same, as in Carey Act segregations above shown, as to sufficiency of water supply and feasibility of the system, in addition to which he reports fully as to whether or not the irrigation works have been completed in a good and workmanlike manner and according to specifications, whether the ditches and laterals have been completed so that water can be turned upon the land at any time required, what portion of each smallest legal subdivision is irrigable under the system, and what portion is above ditches, and also as to whether any portion of the nonirrigable acreage is susceptible of irrigation from any other known sources. This report is required to be very full and complete and upon it is based the patenting of the lands.

Railroad land grants.

Old system.

Investigations were only made when the office had reason to believe that the lands were mineral in character.

Present system.

Investigations are now made as to the mineral or nonmineral character of all selected lands before patent is issued.

Individual lieu selections.

No investigations were formerly made of individual lieu selections, non-mineral affidavits by the selectors being considered as sufficient.

Investigations are now made of all individual lieu selections, whether under the act of 1898 or 1899, and upon the reports received the lands are either clear listed for patent or appropriate action taken.

Right-of-way applications under Act of March 3, 1891.

Few, if any investigations were made except where actual fraud was charged.

Because of the increasing scarcity of water in the Western States many investigations are ordered either by this office or the department touching the available water supply and the feasibility of projects, right of way for which application has been made.

Forfeited right-of-way applications under the Acts of March 3, 1891, and February 15, 1901.

No investigations were made.

During the past year a large number of approved rights of way of five years or over standing have been investigated, to the end that if the projected works had not been built suit might be recommended to declare the easement forfeited and thus clear the records. Upon such reports a large number of suits have been commenced and many easements either judicially declared forfeited or relinquished. During the coming year the number of such investigations which should be made will double if not treble that of last year.

Railroad rights of way under the Act of March 3, 1875.

(Forfeited under various forfeiture acts.)

No examinations made.

It is the intention, if the force of special agents will admit of the work, to investigate this year all approved right-of-way applications over five years old and to clear the record of such as have not been constructed.

*Power sites, Act of February 15, 1901.***Old system.**

No examination.

Present system.

Owing to the increasing value of water power in the West it is necessary to make careful investigation of many applications asked for under the act of March 3, 1891, but which it is suspected are to be used for power purposes and not irrigation purposes, and should therefore be granted by permit under the act of 1901. It is further the duty of all special agents to report to this office any matters relative to power development where it is found that the system is being constructed or construction is contemplated without first obtaining permission from the Government. A number of such reports have been received and have resulted in cessation of the work until application was filed and favorably considered by the department.

Lands withdrawn for power sites.

No examination.

Now all entries upon lands withdrawn for power sites are carefully examined in order that the value of the lands for power purposes, as well as the bona fides of the applicant, may be determined. The area now withdrawn for power sites is 1,515,423 acres.

Until about the middle of last year the work of investigation under the "small holders" act of April 28, 1904, has been merely superficial. This work has increased very largely during the latter part of the past year with every evidence of a large increase during the coming year. The special agent is expected to visit and carefully examine both the base and selected lands, which may be hundreds of miles apart, and after careful investigation to report whether or not they are of the same quality. One investigation of this character involving a 160-acre tract will often take more time than a straight investigation of a couple of thousands of acres which is in a compact body.

Relative to the Carey Act, Arizona and New Mexico are in line for aggressive Carey Act work, and from the older Carey Act States lists for patent are now coming in rapidly, which, in view of the old system of meager investigation, means a double investigation before the lists for patent can be approved. In this connection it may be

noted that inasmuch as Carey Act projects are of a quasi public nature, prompt action must be given them even at the expense of some other public interests.

State selections.

Old practice.

Practically no examination.

Present practice.

Examination of all lands selected by States. Approximately 1,500,000 acres awaiting examination.

Indian allotments.

Practically no examination.

By order of April 4, 1911, all Indian allotments made on public lands are required to be examined and report made as to settlement of Indian and character and value of his improvements; also as to character of land with respect to timber, mineral, coal, phosphate, oil, power-site possibilities, etc. There are about 4,500 of these allotments pending, involving 720,000 acres.

Water companies.

No examination.

Under instructions contained in paragraph 18 of circular dated September 30, 1910 (39 L. D., 253), an investigation and technical report is required to be made of water companies in cases of desert entries, where, on annual proof, expenditures for stock or interest in any such company, through which water is to be secured for irrigating the land, is alleged.

To date approximately 125 companies have been investigated and reported upon. The reports so far obtained are of material value also in adjudication of desert-land entries upon which final proofs have been made. The office examiners are brought more closely in touch with field conditions and thus can act more intelligently on the final proofs submitted.

It must be borne in mind that the work of the field employees is educational. It is just as much their duty to aid and assist in every possible way bona fide settlers and to advise them as to the requirements of the laws as it is to investigate cases involving violations of the public-land laws, and to check attempts to fraudulently acquire public lands.

It is respectfully submitted there is not one unnecessary examination made. To conduct the business of this office in the field in a proper and workmanlike manner, it is absolutely necessary that the head of the office should have full data of the kind shown. The comparative table is given publicity in this report in order that it may be generally understood what the work is which has been done by the field force, and how important it is in its nature. The necessity for many of the very big land suits which are now in progress would never have arisen had an examination of the character now demanded been made prior to the patenting of the lands which it is now sought to reacquire for the United States, on the ground that in the acquisition of the same the grantees violated some provision of the land laws.

NEW SYSTEM OF ACCOUNTS FOR RECEIVERS OF PUBLIC MONEYS.

On July 1, 1912, a new system of records and accounts for receivers of public moneys at United States land offices was inaugurated. This system was installed upon the recommendation of the committee on audit of the Treasury Department, with the approval of the Comptroller of the Treasury. In this system the practice has been discontinued, which has obtained since the office of receiver was created, of such officers submitting abstracts of collections classified according to kind of application, entry, proof, etc., in connection with which the money was received. Under the new system the receiver's abstracts will not indicate the class of application, etc., in connection with which the money was tendered, but will merely show thereon the funds in the Treasury to which the moneys received should be placed. The receiver's abstracts therefore will not hereafter be of any statistical value except as to the total amount received. In order to ascertain monthly the number of allowed applications, approved proofs, etc., certain administrative adjustments in the register's reports or schedules were required, the most notable of which are schedules of allowances which will indicate each month, in itemized form, all approvals and allowances in the several land offices.

Following is a brief statement of the advantages of the new system. The new system will simplify the accounts of receivers of public moneys by eliminating the various classified abstracts of collections. The disposition of every amount received will be evidenced by a check issued by the receiver on his depository; under the system in force prior to July 1, 1912, amounts which were applied in the same month in which received and not deposited to the official credit of the receiver but direct to the credit of the Treasurer of the United States were not evidenced by checks of receivers, which prac-

tice in many cases resulted in much difficulty in adjusting receiver's accounts. The statistics compiled under the new system will be more comprehensive and more accurate than those compiled under the former system, inasmuch as the schedule of allowances will indicate every act under which an application, entry, etc., may be made, and thereby a more detailed classification of applications and entries is possible. Under the new system receivers are required to note upon all application and entry papers the amount of money earned therewith which will be verified in the Accounts Division of the General Land Office, and thereby the clerks in the several adjudicating divisions of this office will be relieved of the necessity of searching through various abstracts for such payments.

In this connection an accounting circular has been prepared which is the most comprehensive circular of its kind that has so far been issued by the General Land Office, and which embodies, in addition to the necessary instructions under the new system, the substance of perhaps 300 circulars and circular letters. This circular will be the means of saving much correspondence which would otherwise have to be had and will form a convenient manual for all field and accounting officers.

REPAYMENTS.

The existing laws governing repayments, section 2362, United States Revised Statutes, act of June 16, 1880 (21 Stat., 287), and the act of March 26, 1908 (35 Stat., 48), provide for the return of moneys covered into the Treasury of the United States, received in connection with the disposal of the public lands, to be repaid to the entryman, or his legal representative, in the absence of fraud on their part, in all cases where lands have been erroneously sold; where money has been paid by innocent parties on fraudulent and void soldiers' and sailors' additional homestead entries; where entries were canceled for conflict; where entries are erroneously allowed and can not be confirmed; where applications to make entry, filing, selection, etc., are rejected; and where any amount has been paid in excess of the legal requirement. Under said laws there were stated during the last fiscal year 2,097 accounts, allowing repayment of \$178,952.15, and during said period there were rejected 619 claims for repayment.

SURVEYING.

The second year of field operations under the direct system has developed the fact that the application of this system is successful in all cases. During the last fiscal year numerous reforms were inaugurated in the matters of accounting, purchases, progress reports, engaging assistants, and writing up of field work, which have been conducive to economy and expedition. The purchasing of animals,

which was largely experimental in the first days of the new system, has been extended so as to embrace nearly all districts. The effect has been a marked reduction in the cost of surveys.

As a result of the civil-service examination of last year a list of over 70 eligibles was created, all of whom have been more or less experienced in public-land survey work, and have now received appointments as United States surveyors. This available force, with an additional number of temporary transitmen authorized by the commissioner, will be sufficient to handle such surveys as may be appropriated for during the fiscal year 1913.

Special appropriations and funds from railroad deposits enabled this office to have in the field on July 1, 1912, 87 parties. When the appropriations for 1913 are fully available the parties will be increased to the number at work last year.

The work of finishing the surveys embraced in contracts has proceeded rapidly and only a few contracts are now outstanding. They are those which upon examination required field correction and reformation of the entire survey.

In addition to the regular apportionments for surveys and special appropriations for surveys in stated localities there have been executed emergency surveys in cases of lands involved in suits brought by the Government. Surveys of abandoned military reservations have been made by this office preliminary to their disposal. Townsites and islands have been surveyed for disposition under the various land laws. This office is now considering a plan of cooperative surveys with the Forest Service, made necessary by the listing of lands within national forests, and plans are being considered whereby the burden of cost to the homesteader is lightened.

Extensive surveys have been in progress during the year of lands within Indian reservations, asked for by the Indian Office for purposes connected with allotments and subsequent opening of the lands to public entry. To further the proper selections for irrigation and other purposes upon Indian lands, this office, upon the request of the Indian Office, has executed, simultaneously with the regular subdivisional survey, a contour or topographic survey. The surveys are paid for out of special and general appropriations in the Indian appropriation bill.

The expense attending the execution of the above surveys has been gradually diminishing owing to the inauguration of business methods in the management of the field force in the matter of supplies and material and the system of rules adopted for guidance in grading of compensation and allowances. The expense of equipping this large force with proper astronomical instruments will in future be lessened, as their initial cost was a large factor in the total cost of surveying. The number of instruments now on hand is ample to equip all the

parties which may be put in the field under present appropriations. The number of Government-owned animals and wagons now on hand bought from previous appropriations will also keep down the expense of future surveys.

The administrative work necessary to control and maintain the field and office work both in the office here and in the offices of the surveyors general, consequent upon the abolition of the contract system, has greatly increased. This emergency has been met by increases for clerk hire in the branch offices, so that the handling of the clerical part of the survey work is now rendered more prompt and the transmission of the completed returns to this office made much earlier after the surveyors have submitted their notes.

The necessary examination here of these returns before acceptance and the correspondence incident to a proper approval of instructions to the surveyors has multiplied the duties devolving upon the expert force in the Surveying Division of this office, so that the office has been unable to keep abreast of the reception of the returns, thus involving delays of several months after the complete record of field notes has been forwarded by the surveyors general before a case can be reached. Congress has, however, granted this office a small increase of force, limited to the fiscal year 1913, for temporary service in bringing up the arrears of work upon returns of surveys and resurveys of public lands, and it is hoped that with this additional help the work will be brought up to date.

The number of acres surveyed during the fiscal year ended June 30, 1912, will be found in the statistical table in another part of the report.

ALASKA SURVEYS.

The work of subdivisional surveys in Alaska, which was suspended for the winter after about 200,000 acres had been surveyed by the six parties operating in the field, was resumed at the opening of the season in June, 1912, and is now (September) in progress, but the necessary preliminaries to the actual running of lines, such as the establishment of the camps and arranging for supplies, the identification of starting points, adjustment of instruments, and other essentials, were such as to render the output for the month of June inconsiderable.

One of the three localities selected for subdivision last season (Chitina) in the Copper River Valley was not occupied this season, as the 1911 surveys in this region covered the greater part of the lands which it was thought would be demanded for settlement and future entry.

The surveys in the Tanana Valley, with Fairbanks as central point, and those of the Susitna Valley, with Seward as a base of opera-

tions, were continued, and reports from the four parties engaged show gratifying progress.

In addition to the regular subdivisional work carried on through independent bases and meridians, according to the requirements of the rectangular system, a number of fragmentary surveys have been executed. These are isolated tracts, impracticable of connection with the groups of regular surveys, because remote from the above-mentioned centers, and varying in area from 1 acre to 320 acres each, yet surveyable under the laws and regulations pertaining to Alaska, provided for in the trade and manufactures, homesteads, soldiers' additional homesteads, and coal-land acts. The surveys in such cases were made by bonded surveyors, at the applicants' expense, subject to the approval of the Surveyor General and the supervision of this office.

The approval of about 25 of such surveys has been ordered during the fiscal year.

REESTABLISHMENT OF TEXAS-NEW MEXICO BOUNDARY.

At the date of the last report upon this work, which was authorized by Congress in a joint resolution approved February 16, 1911, the field work was completed and the surveyors were preparing their notes and plats.

During the last fiscal year the surveyors have worked up their notes and plats and the record consisting of bound volumes of type-written field notes, photographs of monuments erected, duly attested, and certified to by the commissioners on the part of the Government and Texas, have been submitted to the President for his action, looking to approval and forwarding to Congress. The submitted field notes were examined by this office and the reestablishment found to have been well executed and monumented with the corners and material prescribed in the instructions which were approved by the department and the President.

CAREY ACT.

It is not anticipated that the new applications for segregation received during the coming fiscal year will show an increase either in number or acreage. After the more thorough investigation by the State before filing an application for segregation, made possible by the act of March 15, 1910, permitting temporary withdrawal of the land, 19 projects for which such temporary withdrawal had been asked were abandoned and no applications for segregation filed for such projects. The temporary withdrawals have enabled this office to insist upon a more substantial compliance with the requirement that full data be furnished to show that the proposed plan of reclamation is feasible and sufficient. In applications filed by States

without sufficient examination, it has sometimes developed upon field examination by representatives of this office that material modifications of the plan are necessary, entailing in some instances a reexamination in the field. In other cases projects submitted by the States have been found to be totally impracticable. It is expected that the States will more carefully examine projects before applying for segregation and will submit more adequate data with applications, thus expediting field examination and office adjudication.

Investigation of 31 projects having an aggregate area of over 1,000,000 acres has been directed. Fifteen applications for patent covering 208,995 acres have been transmitted to the field for investigation. In most of these investigations the field work has probably been completed or is nearing completion, and it is anticipated that the cases will be adjudicated during the current calendar year.

The near approach in many segregations of the expiration of the 10 years allowed within which to effect the reclamation of the land segregated and other information at hand indicate that the number of applications for patent during the coming fiscal year will show a marked increase. Many of these applications will be based upon segregations approved when the early practice of relying upon the representations of the States as to the sufficiency of the proposed plan of reclamation was followed. In these cases the investigation must be unusually complete. In all applications for patent the adequacy and permanency of the various reservoirs, canals, and structures must be fully considered. The sufficiency of the water supply after prior rights shall have been satisfied must be determined. The detail for investigations under the Carey Act of competent engineers in the field force has been continued. Thus, to their technical qualification has been added exceptional practical experience as irrigation engineers in the particular district to which they are assigned. This is of especial advantage not only in enabling them to accumulate the necessary data relative to stream flow, drainage area, and prior appropriations, but more particularly in determining the vexatious question of water duty, in which determination the informed judgment of a qualified expert in the field is preferable to an office consideration of data, which, in the absence of actual results in the immediate vicinity, can never be complete enough to warrant more than a surmise. The general investigation, under departmental letters of June 17, 1912, of the results obtained under the Carey Act will not require the attention of the detailed engineers. This work will be done by ordinary agents.

With the increase in irrigation the determination of the amounts of water that may ultimately be diverted under rights initiated prior to the initiation of the rights relied upon for the project becomes of

increasing importance. Care must be exercised to ascertain whether or not the claimed priority has been in any manner lost. Novel, intricate, and interesting but difficult questions depending on the varying laws relative to water rights obtaining in the several States are constantly presented for adjudication.

The joint resolution of August 21, 1911 (37 Stats., 38), made an additional million acres of land in Colorado subject to the provisions of the Carey Act.

By legislative act approved May 30, 1912, the State of Arizona accepted, subject to referendum, the grant under the Carey Act. The act accepting and providing for the administration of such grant, however, provides that it shall not apply, except to lands embraced within Indian reservations, until June 1, 1914. Accordingly no applications by Arizona will, in the absence of Federal legislation, be received in the coming fiscal year.

The international situation relative to the Colorado River will affect the administration of the Carey Act in parts of Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming.

RESERVOIR DECLARATORY STATEMENTS.

All lands reserved under the provisions of the act of January 13, 1897 (29 Stat., 484), on which reservoirs have not been constructed within the two years allowed by the act have been restored to the public domain.

The department has held that a reservoir claimant under the act is not entitled to the maximum area allowed by the act, to wit, 160 acres, but only to sufficient land for the proper maintenance of the reservoir. It is therefore necessary to direct examinations in the field in order to ascertain the area absolutely necessary for the maintenance of such reservoirs. Such examinations require much time and are increasing in number. The work in connection with applications under this act, so far as the office force is concerned, is up to date.

RIGHTS OF WAY.

The work of investigation by the field force of easements and rights of way for irrigation, power, and other purposes, granted under the acts of March 3, 1891 (26 Stat., 1095), May 11, 1898 (30 Stat., 404), February 15, 1901 (31 Stat., 790), and February 1, 1905 (33 Stat., 628), where the period for construction has expired by limitation of law, has progressed steadily during the past year, and numerous cases have been reported where such easements and rights of way are subject to forfeiture for nonconstruction during the statutory period. Appropriate action with a view to clearing the records of these unearned grants has been taken in a number of cases, and those remaining will be disposed of as rapidly as possible.

In this connection it may be noted that this class of cases is a continuing one, new cases arising almost daily as the five-year periods for construction expire, and thus necessitates continued investigations in the field, followed by the office work necessary to clear the records where the grants are subject to cancellation or forfeiture.

POWER SITE, ETC., RESERVES.

Pursuant to the provisions of the act of June 25, 1910 (36 Stat., 847), there were 85 withdrawals for power-site purposes, involving 307,891.13 acres, and 19 restorations, aggregating 59,388.31 acres. There were also 6 withdrawals under the same act for public water reserves, covering 86,122 acres; 4 withdrawals under the act of June 25, 1910 (36 Stat., 855), embracing 73,096.62 acres, and 5 withdrawals, under the first mentioned act for various purposes, of 253,400 acres. The total area of the 100 withdrawals is 720,509.75 acres, of which 59,388.31 acres, embraced in 19 restorations, were relieved from reservation. There had previously been 196 withdrawals for power-site purposes, covering, on June 30, 1911, 1,510,647 acres, making the area withdrawn on June 30, 1912, after deducting the area restored, 2,231,156.75 acres. These lands are subject to all the provisions, limitations, exceptions, and conditions of the acts cited.

RAILROAD SELECTIONS.

The work in connection with the preparation of clear lists of railroad listings and selections for patent, because of the many withdrawals of lands for coal classification and with a view to their use for power-site and reservoir purposes, and the greater care exercised in their examination, reports being now required from the Geological Survey and special agents in the field before submitting them for approval, has become more complicated and onerous. And because of the comparatively small acreage of the lists, they now ranging from 40 to 1,000 acres each, when formerly it was common for them to contain 200,000 to 300,000 acres, the work, proportionately, of the field service as well as of this office has been greatly augmented. The field service especially feels the burden, the lands in the present small lists being frequently widely separated and requiring more travel and more time in their location; the former large lists lying in compact bodies much more easy of access and their character much more easy of determination.

STATE SELECTIONS.

During the fiscal year ended June 30, 1912, there were selections under the various State and Territorial grants approved to the amount of 181,280.62 acres. Selections were received for the year

amounting to 249,443.17 acres. There were pending June 30, 1912, selections of this character aggregating 1,921,687.10 acres. Field examination or reports from the Geological Survey with respect to the mineral character of the lands was had as to all selections prior to approval, and under a recent cooperative agreement with the Geological Survey excellent progress is being made in the examination and adjudication of selections of this class, upward of 77,000 acres of selections having been approved during the months of May and June.

In connection with congressional grants of lands to the various States and Territories, for educational and other purposes, reference was made in the last annual report to the fact that there was no provision of law whereby selections might be made in satisfaction of these grants, except under the Cary Act, for lands withdrawn or classified as coal lands, or valuable for coal, and recommendation was made that the provisions of the act of Congress approved June 22, 1910 (36 Stat., 583), be extended so as to remedy this condition. By act of Congress approved April 30, 1912 (Public, No. 141), the privileges contained in said act of June 22, 1910, are extended to the several States. Under this legislation large areas, which, though suitable, were theretofore unavailable for selection by reason of classification or withdrawal, are made subject to selection in aid of common schools, and in satisfaction of other State grants.

IMPERIAL VALLEY LANDS.

Conditions with respect to claims in the Imperial Valley of California are very satisfactory. Upward of 1,000 patents have been issued to entrymen where proper compliance with the provisions of the law, under which their claims were initiated, has been shown, and remaining claims are being adjudicated as speedily as possible.

SWAMP LANDS.

There were pending claims to swamp lands in place June 30, 1912, to the amount of 458,444.59 acres. New claims were reported during the year in favor of the several States to which the swamp-land grants have been extended, but principally in Florida, Minnesota, and Louisiana, amounting to 75,403.97 acres. This is about 30,000 acres in excess of the amount reported during the preceding year. The amount of swamp lands certified and patented was 26,932.15 acres, and claims to the amount of 10,125.16 were rejected and canceled. Thirty-nine contests against swamp-land claims were decided.

An important case, referred to in the last annual report, involving approximately 100,000 acres of land in the Palo Verde Valley, in Riverside and Imperial Counties, Cal., has been closed, and the

claims of the State of California to said lands under the swamp-land grant finally rejected. These lands are rapidly being taken up by settlers and homeseekers.

ADJUSTMENT OF THE CALIFORNIA SCHOOL LAND GRANT.

The work devolving upon the General Land Office, under the basis of adjustment of June 16, 1911, is rapidly nearing completion. In May of this year a claim for payment in money was submitted to the State under paragraph 1 of said basis of adjustment amounting to \$22,431.50, and claims for land were submitted under paragraphs 3 and 4 aggregating 20,359.68 acres. The examination of the records of the State of California at Sacramento, rendered necessary in determining the amount of the claim under paragraph 2, was completed in July, and a final statement under this paragraph is now in course of preparation for submission to the State.

For the purpose of making field examinations of selected lieu lands, and for additional clerical assistance in the General Land Office in order that the reports as they come in from the field may be passed upon and the pending selections adjudicated promptly, an additional appropriation of \$28,000 was requested from Congress. This amount has been granted, the appropriation being contained in the sundry civil act for the current year. This appropriation will be of material aid in bringing about a speedy adjustment and determination of the grant to the State.

SUNK LANDS AND LAKE LANDS IN ARKANSAS.

The policy of the department to the effect that these lands belong to the United States has been settled. The work connected with these cases during the past year has been that of surveying these lands in the field. During the fall and early winter of 1911 Government surveyors were at work, as the result of which all the so-called St. Francis River Sunk Lands proper, with the exception of five townships, were surveyed. The surveys of Buford, Walker, Clear, Flat, and Grassy Lakes have been completed in the field. Of the so-called lakes which have been declared to belong to the Government, but three now remain unsurveyed, namely, Hickory, Carson, and Tyronza. The plats of the five lakes referred to above will be ready for filing in the local land office at Little Rock about October 1, 1912, and it is hoped that the plats of the so-called St. Francis River Sunk Lands proper, with the exception of the five townships referred to above, will also be ready for filing during the present year.

It is the desire of this office to have the surveys in the field of the remaining unsurveyed lands completed during the fall and early winter. As soon as the plats are filed, it is expected that these lands

will be thrown open to entry. Since the initial step was taken by the Government in claiming title to these lands, many persons have signified a desire to take up their homes on these lands and the result is that they are nearly all settled upon.

The Department of Justice has already taken steps with a view to the institution of suits to quiet title in the Government to said lands and as soon as the corrected plats of the surveys are filed, proceedings will be commenced.

During the fall of 1911, a hearing was held for the purpose of taking testimony to determine the question of title to so-called Big, Brown, and Round Lakes, which are alleged to be similar in character to the above-mentioned lakes. The department has not as yet rendered its decision with reference to the last-named lakes.

In the event that the Government succeeds in the proposed suits to quiet title, there may be considerable areas of other similar lands in the State of Arkansas with reference to which the question of title will have to be investigated by this office.

Recently the question of title relative to certain lands between the original meander and the actual present water's edge of so-called Ferry Lake, in the State of Louisiana, has arisen and investigations have been made under the supervision of this office. These lands are said to contain valuable deposits of coal and gas. The case originated through an application for survey, filed by certain placer mineral claimants. A decision will soon be rendered in this case.

Some time ago the department held that certain lands in so-called Black Lake, in Louisiana, were erroneously omitted from the original survey and therefore belong to the Government. It is possible that there are other lands within the meanders of so-called Black Lake and other lakes similarly circumstanced in the State of Louisiana which will require field investigation. In nearly all of these cases there are two classes of claimants who have endeavored to establish title adversely to the Government, namely, the riparian owners and the State, the latter generally claiming by virtue of the swamp-land grants. This class of work has increased considerably during the past few years and gives promise of requiring considerable attention on the part of this office in the future.

RECLAMATION WORK.

The reclamation work of the office has developed during the year, both in the number of existing entries and the number of questions arising in connection therewith. New legislation affecting entries within areas included in withdrawal under the reclamation act of June 17, 1902 (32 Stat., 388), has radically changed the status of many of these entries. During the year a new general circular covering this branch of the work has been issued, and as new legislation

was enacted supplemental circulars have been prepared. The office has cooperated with the Reclamation Service in securing prompt action, and the local land officers having charge of lands within reclamation projects have been instructed as to the necessity of special action on water-right applications.

No new projects have been opened during the year, but in several projects new irrigation units have been covered by public notice, and numerous changes in irrigable areas have occurred, necessitating amendment of original farm unit plats.

Withdrawals of land under the reclamation act have been limited but large tracts have been released from withdrawal and restored to the public domain. The collection of water-right charges under the supervision of this office has been so handled as to reduce the number of delinquent water users to a very low minimum.

HOMESTEAD ENTRIES IN FOREST RESERVES.

Notices were issued during the past year, in accordance with the provisions of the act of June 11, 1906 (34 Stat., 233), in 1,828 lists, by which approximately 182,800 acres of agricultural lands in national forests were opened to settlement and entry under the homestead laws. Up to June 30, 1912, there have been restored to settlement and entry under this act approximately 786,150 acres. There are 1,600 lists still pending, which will be opened as fast as practicable, when an appropriation is available to pay the cost of advertising.

ABANDONED MILITARY RESERVATIONS.

During the past year there have been turned over to the department under the act of July 5, 1884 (23 Stat., 103), the following military reservations: The portion of Fort Grant, Ariz., about 12,160 acres, not included in the limits of the Crook National Forest by Executive order of August 10, 1911; the remainder of Fort Assiniboine, Mont., about 168,610 acres, by Executive order of November 20, 1911; Fort Niobrara, Nebr., about 60,000 acres, by Executive order of August 1, 1911; and Fort Brown, Tex., about 358.8 acres, by Executive order of October 14, 1911.

There is legislation pending relative to the method of disposing of Fort Grant, Fort Assiniboine, and Fort Niobrara, and on that account it is probable that there will be no disposal of lands in these reservations until next year. Fort Grant and Fort Assiniboine are not yet surveyed. A portion of Fort Brown, Tex., has been set aside by Executive order for experimental purposes by the Agricultural Department, and the remainder, as well as the Fort Ringgold, Tex., abandoned military reservation, have been surveyed and appraised

with a view to their early disposal. Plans are under way to have Fort Grant and a portion of Fort Assinniboine surveyed as soon as funds are available.

LIEU SELECTIONS FOR LANDS IN INDIAN RESERVATIONS.

Under the act of April 21, 1904 (33 Stat., 211), which provided for an exchange by an owner of private land, over which an Indian reservation has been extended by Executive order, for vacant non-mineral, nontimber, surveyed public lands of equal area and value and situated in the same State or Territory, applications to select lands in exchange for private lands in the Zuni and Navajo Indian Reservations in New Mexico and the Moqui Indian Reservation in Arizona, have been filed to the extent of 460,204.30 acres. Patents have issued for 256,209.39 acres, and 30,200 acres have been approved for exchange by the Secretary of the Interior. The remaining 173,794.91 acres of tendered lands are now being examined looking to the question of exchange.

INDIAN ALLOTMENTS.

During the fiscal year ended June 30, 1912, 1,428 Indian allotments were received, 2,174 were disposed of by approval, and 3 by cancellation, leaving a total of 3,178 on hand at the close of the fiscal year.

INDIAN RESERVATION OPENINGS.

Registrations were held for the opening of lands in three Indian reservations during the year, at which the following number of applications were presented: For Fort Berthold lands in North Dakota, 20,504; for Rosebud and Pine Ridge lands in South Dakota, 53,728.

For the purpose of lessening the cost of these openings, both to the Indians and to the applicants, but one registration was held for the opening of the lands in the Rosebud Reservation and the Pine Ridge Reservation, although they were opened under separate acts of Congress.

The entries of these lands are now being made.

LANDS OF CHOCTAW, CHICKASAW, AND CREEK INDIANS IN ALABAMA AND MISSISSIPPI.

The report for the fiscal year ended June 30, 1911, embraced a brief statement of the facts in relation to the situation involving and affecting numerous reservations of lands in the State of Alabama, which had been made for the benefit of members of the Creek Nation of Indians, pursuant to the treaty of March 24, 1832 (7 Stat., 366). That statement was coupled with a suggestion concerning the im-

portance of legislation for the purpose of relieving the conditions resulting from the omission to issue patents for a large number of such reservations, due to causes there recited, and from the fact that the greater portion, if not all, of the lands so reserved were claimed by numerous persons derailing title from the Indian reservees, but who were, in many instances, unable to establish the fact of purchase from the Indian, or the validity of a purchase which had been sufficiently established.

The fact is here noted that, by its enactment approved on June 4, 1912 (Public, No. 177), Congress made provision whereby all right, title, interest or claim of the United States in and to all lands reserved for members of the Creek Indians in Alabama was remised and quitclaimed to and in favor of those persons, firms, or corporations then holding and claiming the same under color of title. A further provision of that legislation authorized and directed this office to make suitable notations on its records whereby to close out and dispose of all pending-claims of the character referred to in the act, without issuance of patent thereon.

The purpose of this legislation, definitely expressed by its terms, was to free the lands in all Creek reservations in Alabama from any and every claim of the United States, in such manner, to such purpose, and with such effect that the persons claiming the same might establish and maintain their titles thereto in accordance with the laws of the State of Alabama, whether by adverse possession or otherwise. Such action as is necessary to execute the directions of this act, in so far as it requires notations to be made on the records of this office, is being diligently pursued and will be presently completed.

In this same connection attention is invited to the legislation proposed by pending Senate bill 3306, on which the department submitted a favorable report and recommendation under date of January 12, 1912. By the terms of this measure the Secretary of the Interior is to be authorized to investigate and ascertain the status of the reservations of lands made pursuant to the provisions of the treaty concluded at Dancing Rabbit Creek on September 30, 1830, with the Choctaw Nation of Indians (7 Stats., 333); the treaty concluded at Washington on March 24, 1832, with the Creek Tribe of Indians (7 Stats., 366); and the treaty concluded on Pontitock Creek on October 20, 1832, with the Chickasaw Nation of Indians, all affecting lands in the States of Alabama, Mississippi, and Tennessee, in respect of which reservations conditions exist similar to those prevailing in connection with the Creek reservations above mentioned.

So far as this proposed legislation would relate to reservations authorized by the Creek treaty of 1832, it has been rendered unnecessary by the congressional enactment of June 4, 1912, previously referred to and considered; but in so far as it contemplates future

legislative relief for like conditions affecting Choctaw and Chickasaw reservations in Alabama and Mississippi its early adoption is greatly to be desired. In this connection it is to be noted and remembered that in addition to the treaties severally mentioned in the Senate bill as it now reads other treaties with the Choctaw and Chickasaw Nations are of importance as affecting these reservations. Thus the treaty concluded at Doaks Stand on October 18, 1820, with the Choctaw Nation (7 Stats., 210); the treaty concluded at Washington on January 20, 1825, with the same nation (7 Stats., 234); the treaty concluded at Pontitock Creek on October 22, 1832, with the Chickasaw Nation (7 Stats., 388); and the treaty concluded at Washington on May 24, 1834, with the same nation (7 Stats., 450), all contain supplementary, qualificatory, or modifying provisions in relation to the individual reservations for which the earlier treaties mentioned in the bill engaged the United States.

The continued lapse of time can only serve to accentuate and further increase the evils and embarrassments inherent in a situation such as that which now affects the titles to numerous tracts of lands in the States above named, and any legislative measure which proposes to remove or even materially lessen the condition of doubt and insecurity under which those titles are held or claimed could not be the object of anything but commendation.

CEDED CHIPPEWA PINE, MINNESOTA.

Another sale of pine timber on ceded Chippewa lands, Minnesota, was held on October 21, 1911, under the act of June 27, 1902 (32 Stat., 400). The offering consisted of 90 per cent of the timber on 4,572.04 acres in the Minnesota National Forest, estimated to contain 1,107,000 feet of white pine and 1,017,000 feet of Norway, and 100 per cent of the timber on 26,736.83 acres outside of said reserve, estimated to contain 13,337,000 feet of white pine and 11,896,000 feet of Norway pine. This timber had been offered at previous sales, and was not sold for want of bidders. Bids were accepted for the timber on 9,182.90 acres, containing 4,815,000 feet of white pine and 2,016,000 of Norway, the total price being \$34,524.74, an average of \$5.06 per thousand feet.

The past season was the ninth in the logging operations under said act of June 27, 1902, and was a successful year. There were cut 102,425,370 feet of timber, the price of which is \$878,717.39, against a cut of 80,005,150 feet, valued at \$572,830.73 the preceding year. The amount of logging the past year has been exceeded but three times since the logging operations began in the year 1903.

The following statement shows by sales the amount of timber sold and the amount of the bids, based on the original Government

timber estimates, and the amount of timber actually cut, and the price paid:

Proceeds of Chippewa logging.

Date of sale.	Government estimate (M feet b. m.).	Estimated amount of bids.	Logged (M feet b. m.).	Price paid.
Mar. 2, 1903 ¹	18,636	\$68,559.70	26,816	\$188,326.80
Dec. 5, 1903 ¹	223,921	1,434,071.68	345,016	2,101,753.77
Dec. 23, 1903 ¹	169,308	1,218,132.02	299,095	2,111,829.74
Nov. 15, 1904.....	146,560	932,320.12	188,188	1,214,745.17
Nov. 17, 1904 ¹	9,718	55,123.45	18,789	97,524.77
July 17, 1907 ¹	2,066	18,705.05	3,754	34,160.52
Mar. 15, 1910 ¹	2,169	15,378.69	3,559	26,895.96
Sept. 15, 1910.....	314,785	2,709,330.04	120,515	1,047,330.50
Oct. 21, 1911.....	6,323	34,524.74	263	1,490.23
Special sales ¹	504	4,980.50	844	5,769.49
Trespass.....			2,731	23,019.17
Interest, etc.....				9,133.06
Total.....	889,483	6,491,080.99	1,609,567	6,811,968.70

¹All timber cut and contracts completed.

The statement of the amount of trespass includes timber cut from Indian allotments and from lands claimed by the State under the swamp-land act, amounting in all to about \$5,000.

The percentage of white pine of all the timber cut has been 60.2, and of Norway 39.8, and the average price per thousand feet realized has been \$6.72. The total expense of scaling and supervising the same has been \$282,949.29, or 4.17 per cent of the total receipts.

OPENING OF CHIPPEWA LANDS TO HOMESTEAD ENTRY.

After the last sale of October 21, 1911, there was unsold the timber on 20,173.25 acres outside of the Minnesota National Forest, the estimates showing that there were 19,718,000 feet on the lands, or less than 1,000 feet per acre. This timber was scattered and had been nearly all offered two or three times and not sold for want of bidders. The land has been looked over during the present summer with a view to its disposal to homesteaders under the act of June 25, 1910 (36 Stat., 862). Under this law the homestead entryman will be required to pay for the timber not less than the minimum price fixed by law at the time of making entry, and in addition thereto \$1.25 per acre, as provided in section 6 of the act of January 14, 1889 (25 Stat., 642). It is the purpose to open to homesteaders next spring such of the lands as contain insufficient timber to attract bids from millmen.

NATIONAL FORESTS.

Since the issuance of the last annual report 22 national forests have been enlarged and 53 reduced under the act of June 4, 1897 (30 Stat., 34, 36), and 12 new administrative units have been formed by subdividing certain national forests, with additional areas from the public domain in some instances. The Garces National Forest has

been consolidated with the Coronado National Forest, Arizona, and the Ocala and Choctawhatchee have been consolidated as the Florida National Forest, Florida. There are now 163 national forests, embracing 187,406,376 acres. The decrease in area of national forests since the beginning of the fiscal year is 3,201,867 acres.

During the fiscal year 3,440,252 acres have been excluded from the national forests by reclassification or otherwise, 2,497,340 acres thereof being within existing Indian reservations. The unappropriated public lands in 585,690 acres excluded during the fiscal year and in 112,728 acres excluded during the last fiscal year have been restored to settlement and entry. Areas temporarily withdrawn but not needed for forestry purposes are released from withdrawal upon the recommendation of the Secretary of Agriculture. Since the issuance of the last annual report 1,904,990 acres have been released from such withdrawal and the public lands therein opened to settlement and entry.

To protect possible power sites, all proclamations excluding public lands from the national forests since June 30, 1911, have contained a proviso withdrawing such lands for classification under the act of June 25, 1910 (36 Stat., 847), in order that prior to restoration thereof examination may be made and such of the lands as are found to be valuable for power may be withdrawn for that purpose.

During the fiscal year 29 stations, embracing 3,270 acres, have been withdrawn by Executive order, under the act of June 25, 1910 (36 Stat., 847), for use by the Forest Service in the administration of the national forests, and 21 withdrawals for such purpose have been revoked, covering 3,221 acres. There are now 24 rights of way for wagon roads and 3,991 administrative sites withdrawn, embracing 570,897 acres, 171 sites and 23,267 acres being near and 3,820 sites and 547,630 acres in the national forests.

NATIONAL MONUMENTS.

No new national monuments were created during the year, but the Navajo National Monument in Arizona, which reserved all ruins within a very large area, lying wholly within the Navajo Indian Reservation, was reduced by Executive order of March 14, 1912, to three small tracts containing in all 360 acres. Within these tracts are located large and very important prehistoric ruins. Upon the walls of one of these are plainly legible the inscriptions made by one of the earliest Spanish exploring parties in the Southwest.

After a careful survey of the originally reserved tract by Dr. G. P. Merrill, of the Smithsonian Institution, who was detailed for the purpose on request of this department, the Petrified Forest National Monument, in Arizona, by a second proclamation, dated July 31, 1911, was reduced in area from 60,776 acres to 25,625 acres. Within

the reduced area two tracts have been designated for the collection of minor specimens of petrifications by tourists and other visitors to the monument. This will be permitted under the supervision of the custodian in charge.

The national monument act of June 8, 1906 (34 Stat., 225), happily provided for the creation, by proclamation of the President, of certain classes of public reservations which theretofore had not been possible, except through acts of Congress: Many appeals had been made to create national parks, and many bills were introduced in Congress for that purpose which failed of passage. To secure a separate Federal statute was a cumbersome process, was rarely successful, and when successful was invariably accompanied by long delays. The monument law eliminated all of these difficulties, and appeals to its authority have thus far established 28 reservations. These are not only exceedingly popular where known, but are of very great value as standing public contributions to the world of science and art, to history and esthetics, to recreation, and to the general increase and diffusion of knowledge. They embrace the most extraordinary examples of forest growth; of caverns, canyons, and natural bridges; of lofty monoliths and of towering cliffs, on which the first words of American history were carved and are still legible; of the most remarkable series of cliff and plain communal dwellings of a prehistoric people not found elsewhere in the world, and near them the mission ruins of the earliest Spanish crusaders for church and spoil. All of these are certainly worthy of the fostering care of the Government. Those which are inaccessible should be made easily accessible and capable of exploration, examination, and study; and where possible the mission and prehistoric ruins should be restored by authority and under competent supervision. All monuments whose reserved objects are subject to plundering and ruin by vandals or to unauthorized exploration by others need custodians on the ground.

The recommendations made during the several years past are most earnestly renewed—that an appropriation of at least \$5,000 be submitted in the annual estimates and urged by the department for the preservation, development, administration, and protection of the national monuments, the same to be expended under the direction of the Secretary of the Interior.

BIRD RESERVATIONS.

During the fiscal year two bird reservations were enlarged and one slightly reduced in area, as follows:

The Cold Springs Reservation, Oreg., was enlarged November 25, 1911, by adding two small tracts, aggregating 160 acres.

The Minidoka Reservation, Idaho, was considerably enlarged February 21, 1912, because of the elevation of the flow line of the reservoir which extended, toward the lower end, over and far beyond the smaller legal subdivisions which bordered the reservoir as originally created.

The Clear Lake Reservation, Cal., on January 13, 1912, was reduced by 320 acres for administrative reasons. Within this smaller tract is located the dam site and the buildings of the official in charge, and the elimination embraced the narrow arm of the lake above and below the dam site.

Four new reservations were created, as follows:

The Niobrara Reservation, Nebr., January 11, 1912, containing nearly 23 square miles. This tract is a part of the abandoned Fort Niobrara military reservation, and the lands reserved are chiefly sand hills and rocky bluffs along the Niobrara River.

The Hazy Islands Reservation, created January 11, 1912, and the Forrester Islands Reservation, also created January 11, 1912, are both located in the Pacific Ocean, at the extreme southern extremity of Alaska. Both embrace small islands the areas of which are unknown.

The Green Bay Reservation, Wis., on February 21, 1912, containing 1.87 acres. This is a small island at the mouth of Green Bay, Wis.

There are now 56 bird reservations, which are distributed over the public-land States and insular possessions and extend from Porto Rico to Midway Islands, in the Pacific, eight being within Alaskan territory. A comparative estimate of the beneficial birds of the country was made by competent ornithologists about 16 years ago, and the report then made conclusively showed that all beneficial species, and these include game birds, nearly all of the birds of prey, and the insectivorous birds, were not only being seriously reduced in numbers, but in some cases were approaching extinction. The comparative number of beneficial birds of all species was found to have been reduced in the several States between 10 and about 75 per cent, as compared with conditions of 25 years before. The continuation of this appalling destruction promised disaster to agriculture, with its consequent effect upon the basic problem of human existence. Concerted effort was therefore at once directed, first, toward securing protective laws from the States and later the cooperation of the General Government.

The Federal bird reserve has become a universally recognized and heartily approved institution. It is opposed only by those who transform the living plume into the millinery monstrosity and temporarily profit by the tremendous sacrifice.

No other form of Government reserve more greatly concerns the general welfare than the bird reserve, because the successful

administration of no other is so intimately associated with the food supply. The abandonment of national parks, forest, military, naval, lighthouse, and all other similar reservations would in no degree affect the crops of the farmer, nor would an increase in the number or area of such reserves reduce the cost of living, but the protection of the breeding grounds of the game birds, both of the land and water, means more and a greater variety of food; the protection and multiplication of the vermin and insect destroying birds means more certain crops and greater crops.

Thus far official administrative effort has been wholly inadequate because of a lack of funds. In fact, but for the active cooperation of a volunteer and unofficial body—the National Association of Audubon Societies, which spends thousands of dollars annually in its effort to create public sentiment in favor of bird protection and added thousands in making the underpaid and unpaid official warden service on bird reserves effective, the protection afforded the birds on many Government reserves would be wholly ineffective. Two bird wardens in Florida have been killed by plume hunters, one being shot in the back while engaged in the discharge of his official duties.

LEGISLATION.

THREE-YEAR HOMESTEAD.

Of new legislation since the last annual report the most important is the so-called "Three-year homestead bill." On June 6, 1912, the President approved the act which is known as the "Three-year homestead bill." Instructions have been issued under this act, and reports received from the field indicate that during the coming year the work of the local land offices and of the General Land Office, in Washington, will be very much augmented. There are in the public-land States over 300,000 homestead entries, upon which proof in the neighborhood of 50,000 will be made under the old law during this fiscal year. This would leave about 250,000, and of that number in the neighborhood of 100,000 will probably be affected by the new law. Estimates have been made, and the most conservative judgment is that at least 50,000 proofs, in addition to those which would ordinarily be offered, will be made during the coming year under the terms of the three-year homestead bill. If this estimate should be correct, and at the present writing it seems to be very conservative, this office will have over twice as much work in this line as it had last year.

With the additional help which Congress has provided it is hoped that the work can be kept abreast. If the actual number of proofs offered should exceed the estimate of 50,000, then the office will necessarily fall behind with the additional help provided.

RECLAMATION ENTRIES AND WATER-RIGHT CHARGES.

On August 9, 1912, an act was approved providing for the issuance of patent reserving a first lien to the United States for unpaid water-right charges on all entries where proof of compliance with the homestead law and a showing of reclamation is made. Final water-right certificate is also provided for on private water-right contracts upon a showing of reclamation and payment of accrued charges. This legislation serves to remove restrictions on the development of lands within reclamation projects.

This same act also authorizes the designation of bonded officers of the Reclamation Service on the several projects to collect water-right charges, transferring the supervision of such collection from the Commissioner of the General Land Office to the Director of the Reclamation Service. The location of collecting officers on the projects, rather than at local land offices frequently many miles distant, will prove a convenience to the water users.

PLACER MINING CLAIMS IN ALASKA.

August 1, 1912, Congress passed an act modifying and amending the mining laws in their application to Alaska. The act has no application whatever to lode claims and applies only to placer mining claims located in Alaska on or after August 1, 1912. This act contains several important amendments relating to the placer mining claims located in Alaska on or after August 1, 1912, namely: The limitation of an association placer to a maximum of 40 acres, the clause which shortens the length of time in which to commence to develop said placers by requiring that annual labor or "assessment work" shall also be performed during the year in which such placer mining claims were located, and the provisions which limits the number of placer locations which may be made through the use of powers of attorney. There is also a restriction upon the number of placer mining claims that may be located in any calendar month by power of attorney. The act also deals with the shape of such placer by providing that it can not be patented where it is "longer than three times its greatest width," or contains a greater area than is fixed by law, and, finally, the act provides in section 5, that any placer mining claim attempted to be located in violation of the act shall be null and void, and the whole area thereof may be located by any qualified locator as if no such prior attempt had been made.

RECOMMENDATIONS.**REGULATION OF PROFESSIONAL LOCATORS AND PERNICIOUS LITERATURE IN RELATION TO PUBLIC LANDS.**

The last annual report of this office conveyed a recommendation in behalf of legislation whereby to regulate the practices of professional locators or those persons who offer for hire or reward paid to them

in that behalf to locate settlers and entrymen upon desirable tracts of public lands. Owing to the frequency and the seriousness of the complaints received in this office, revealing the injurious consequences and grievous hardships suffered by persons who have sought homes on the public domain, resulting from the ignorant or willful deception practiced by persons employed and paid to secure for them satisfactory locations, it is believed that the subject is well worthy of congressional attention, and for this reason the recommendation of the former report is respectfully and most earnestly renewed, in the hope that it will not be unnoticed.

It is also desirable in this connection to invite attention to the pernicious consequences resulting from the use of the United States mails for the purpose of distributing false and misleading circulars, pamphlets, cards, and other advertising matter in relation to the inducements and contemplations offered to settlers by the public lands in localities therein described and concerning the rights and privileges of settlers upon and entrymen of public lands in those localities. It is not intended thus to refer to news items and contributions appearing in magazines and newspapers, nor is it proposed to condemn the very usual and altogether to be expected laudation in which local "boomers" commonly indulge. What are intended to be reprobated, however, are those publications prepared, published, and distributed by persons, firms, and corporations engaged in and intending to be profited by inducing settlement on public lands in such localities as they have selected for their operation, in and by which such publications, statements, and representations are made concerning the purposes of the Government in relation to the lands therein mentioned or concerning the legal rights and privileges of settlers upon and entrymen of those lands, such statements or representations being ignorantly or knowingly false and deceptive.

The attention of this office has frequently been invoked to literature of this character, the object of which, as clearly revealed therein, is to induce receivers thereof to make remittances to the persons responsible for the publication as payment or partial payment for services to be rendered by such person in securing the remitter a location upon or entry of some tract of land in a described vicinity, or to induce him to visit the locality in question and there employ and pay that person for his services in effecting such location or entry.

It is believed that this matter should also receive congressional consideration and be the subject of some appropriate legislation whereby to enlarge and extend the scope of the present laws governing the use of the United States mails in the promotion of fraudulent purposes, or by which to provide some other adequate means of regulation and restraint. It may not be inappropriate and impracticable to require publications of this character to be submitted to and

receive the sanction of this department in so far as they attempt to define the legal status of the lands to which they relate or the operation and effect of the laws governing their disposition.

ATTENDANCE OF WITNESSES.

Considerable difficulty has been experienced by this office in the administration of the act of January 31, 1903 (32 Stat., 790), commonly known as the compulsory attendance act. This act provides a method by which the attendance of witnesses at hearings held under the jurisdiction of this office involving public lands may be secured.

The Comptroller of the Treasury has held that under the terms of the act a witness who attends at the place of hearing is entitled to receive only fees to cover the distance traveled in the county in which the hearing is held, and that for any expenses incurred in travel outside of that county he is not entitled to any reimbursement. It is also held by the Comptroller of the Treasury that where a deposition is taken under section 4 of this act in the county of the witness's residence the witness is entitled to but travel expense for the distance within the county.

This construction of the law has resulted in a great deal of hardship upon witnesses and considerable embarrassment to this office, for the reason that a witness may live just over the line of the county in which the hearing is held; and it would be much more convenient, and considerably less expensive, to have him appear at the place of hearing, although it is in another county, than it would be to take his deposition in the county in which he resides, for in many instances the nearest officer authorized to take deposition might be in a part of the same county far removed from the place of residence of the witness.

It is believed that the difficulties and embarrassments now attending procedure under the act would be obviated if the second proviso to section 1, which now reads as follows:

Provided further, That said subpoenas shall be served within the county in which attendance is required and at least five days before attendance is required—

Should be so amended that it would appear in this form:

Provided further, That said subpoenas shall be served at least five days before the attendance is required, and attendance shall not be required of any witness who resides at a greater distance than 100 miles from the place of hearing.

And by amendment of section 4 of the act, in its first sentence, in the manner following:

That whenever a witness resides at a greater distance than 100 miles from the place of hearing any party to the proceedings may take the testimony of such witness in the county of such witness' residence in the form of depositions by giving 10 days' written notice of the time and place of taking such depositions to the opposite party or parties.

The other provisions of section 4 to remain as at present.

This will relieve a situation which has proved most embarrassing to the office, and will also make the practice in land cases similar to that which obtains in the United States courts.

**CERTIFIED COPIES OF RECORDS IN SURVEYORS GENERAL OFFICES
AND LOCAL LAND OFFICES.**

The Comptroller of the Treasury, by his decision of September 17, 1912, has held that moneys received for exemplified copies of plats and other records by Surveyors General must be deposited in the Treasury of the United States to the credit of the fund of "Miscellaneous receipts." By so depositing such moneys they are not available for the payment of the expenses of making such copies, for which work no other fund is available.

The act of August 24, 1912 (Public, No. 302), provides, in part, that moneys received by all offices under the Interior Department for making certified copies of official records must be deposited to the fund of "Miscellaneous receipts."

The circular of November 22, 1909 (38 L. D., 312), to registers and receivers and United States Surveyors General contains the following paragraph:

When certified copies of records are requested and the pressure of public business will not permit of the work being done by the office force, the parties desiring same, if desk room is available, may be permitted to make such copies, but before certification by you copies thus made must be carefully compared by your office and you will charge therefor the fees allowed by law.

Public policy demands that these copies should be furnished, especially as they are largely for the benefit of applicants and prospective applicants for portions of the public domain, and it is a hardship on the part of applicants for copies who do not reside in the same town where the office containing the records is situated to refuse to furnish them the copies requested, as it would entail considerable expense upon them to send persons to such office to make the desired copies. As far as copies of local land office records are concerned, it is recommended that an additional appropriation of \$25,000 be requested to employ the necessary clerical help in those land offices where it is impossible under the pressure of ordinary business for the present clerical force to make these copies.

In the offices of the surveyors general it seems that most of the copies requested to be made in those offices are those pertaining to mineral surveys, although a considerable portion are in connection with agricultural and other surveys. The best solution, to my mind, of the problem which presents itself in view of the comptroller's decision of September 17, 1912, above alluded to, which would prohibit employees paid from the fund of "Deposits by individuals for

surveying public lands" from making copies, is to have enacted into law a provision which would call for the deposit of moneys paid to surveyors general by applicants for exemplified copies of records and plats in the offices of surveyors general, to the credit of the Treasurer of the United States to the fund of "Deposits by individuals for surveying public lands," and the same to be available for the payment of the compensation of the clerks and others engaged in such work, and in payment for the stationery and office supplies used in such work, provision being made that specific authorization by the Commissioner of the General Land Office must be obtained before any expense chargeable to such fund shall be incurred for clerk hire and incidental expenses by the respective surveyors general in the conduct of their offices.

A provision of this kind has been inserted in the annual estimates of the appropriations for this office, following the estimates for salaries and contingent expenses in the office of the surveyors general for the fiscal years 1910, 1912, and 1913, without favorable action on the part of Congress.

Without repeating the individual items recommended for legislative enactment in the last annual report, reference is respectfully made to said report (pp. 43 and 44), in which needed legislation is summarized.

Very respectfully,

FRED DENNETT, *Commissioner.*

STATISTICS RELATING TO THE DISPOSITION OF THE PUBLIC DOMAIN.

Area of States and Territories.

[Based upon careful joint calculations made in the General Land Office, the Geological Survey, and the Bureau of the Census.]

State or Territory.	Land surface.		Water surface.		Total area.	
	Sq. m.	Acres.	Sq. m.	Acres.	Sq. m.	Acres.
Alabama.....	51,279	32,818,560	719	460,160	51,998	33,278,720
Arizona.....	113,810	72,838,400	146	93,140	113,956	72,931,540
Arkansas.....	52,526	33,616,000	810	518,400	53,336	34,134,400
California.....	155,662	99,617,280	2,645	1,692,900	158,297	101,310,080
Colorado.....	103,668	66,341,120	290	185,000	103,948	66,526,720
Connecticut.....	4,820	3,084,800	145	92,800	4,965	3,177,600
Delaware.....	1,965	1,257,600	405	259,200	2,370	1,516,800
District of Columbia.....	60	38,400	10	6,400	70	44,800
Florida.....	54,861	35,111,040	3,805	2,435,200	58,666	37,546,240
Georgia.....	58,725	37,584,000	540	345,600	59,265	37,929,600
Idaho.....	82,354	53,346,560	534	341,760	82,888	53,688,320
Illinois.....	58,043	35,867,520	622	398,080	58,665	36,265,600
Indiana.....	36,046	23,068,800	309	197,760	36,354	23,266,560
Iowa.....	55,598	35,575,040	561	359,040	56,147	35,934,080
Kansas.....	81,774	52,335,360	384	245,760	82,158	52,581,120
Kentucky.....	40,181	25,715,840	417	266,880	40,598	25,982,720
Louisiana.....	48,409	29,061,760	3,097	1,982,080	48,506	31,043,840
Maine.....	29,595	19,132,960	3,145	2,012,000	33,040	21,145,600
Maryland.....	9,941	6,362,340	2,386	1,527,040	12,327	7,889,280
Massachusetts.....	8,629	5,444,960	227	145,360	8,856	5,590,240
Michigan.....	57,480	36,787,200	500	320,000	57,980	37,107,200
Minnesota.....	90,858	51,749,120	3,624	2,447,360	94,482	54,196,480
Mississippi.....	46,362	29,671,040	503	321,120	46,865	29,992,000
Missouri.....	68,727	43,985,280	603	443,120	69,330	44,428,400
Montana.....	146,201	93,585,600	796	509,440	146,997	94,078,080
Nebraska.....	76,806	49,157,120	712	455,680	77,520	49,612,800
Nevada.....	109,821	70,285,440	869	556,160	110,690	70,841,600
New Hampshire.....	9,031	5,779,840	310	198,400	9,341	5,978,240
New Jersey.....	7,514	4,808,960	710	454,400	8,224	5,263,360
New Mexico.....	122,503	78,401,920	131	83,440	122,634	78,485,360
New York.....	47,654	30,498,560	1,550	992,000	49,204	31,490,560
North Carolina.....	48,740	31,193,600	3,686	2,359,040	52,426	33,552,640
North Dakota.....	70,183	44,917,120	654	418,560	70,837	45,335,680
Ohio.....	40,740	26,073,600	300	192,000	41,040	26,265,600
Oklahoma.....	69,414	44,424,960	643	411,520	70,057	44,836,480
Oregon.....	95,607	61,188,480	1,092	698,880	96,699	61,887,360
Pennsylvania.....	44,832	28,692,480	294	188,160	45,126	28,880,640
Rhode Island.....	1,067	682,880	181	115,840	1,248	798,720
South Carolina.....	30,496	19,516,800	494	316,160	30,990	19,832,960
South Dakota.....	76,868	49,195,520	747	478,080	77,615	49,673,600
Tennessee.....	41,687	26,679,680	335	214,400	42,022	26,894,080
Texas.....	262,398	167,934,720	3,498	2,238,720	265,896	170,173,440
Utah.....	82,184	52,597,760	2,806	1,796,840	84,990	54,393,600
Vermont.....	9,124	5,839,360	440	281,600	9,564	6,120,960
Virginia.....	40,262	25,767,680	2,365	1,513,600	42,627	27,281,280
Washington.....	66,836	42,775,040	2,291	1,466,240	69,127	44,241,280
West Virginia.....	24,022	15,374,080	148	94,720	24,170	15,468,800
Wisconsin.....	55,266	35,363,840	810	518,400	56,066	35,882,240
Wyoming.....	97,594	62,460,160	320	204,900	97,914	62,665,060
Total.....	2,973,890	1,903,289,600	52,899	33,856,360	3,026,789	1,937,144,960
Alaska.....					590,884	378,165,760
Guam.....					210	134,400
Hawaii.....					6,449	4,127,360
Panama Canal strip.....					436	279,040
Philippine Islands.....					115,026	73,616,640
Porto Rico.....					3,435	2,198,400
Tutuila Group, Samoa.....					77	49,280
Total.....					3,743,306	2,395,715,840

Owing to their location adjoining the Great Lakes, the States enumerated below contain approximately an additional number of square miles as follows: Illinois, 1,674 square miles of Lake Michigan; Indiana, 280 square miles of Lake Michigan; Michigan, 16,653 square miles of Lake Superior, 12,922 square miles of Lake Michigan, 9,926 square miles of Lake Huron, and 460 square miles of lakes St. Clair and Erie; Minnesota, 2,514 square miles of Lake Superior; New York, 3,140 square miles of lakes Ontario and Erie; Ohio, 3,443 square miles of Lake Erie; Pennsylvania, 891 square miles of Lake Erie; Wisconsin, 2,378 square miles of Lake Superior and 7,500 square miles of Lake Michigan.

In addition to the water areas noted above, California claims jurisdiction over all Pacific waters lying within 3 English miles of her coast; Oregon claims jurisdiction over a similar strip of the Pacific Ocean 1 marine league in width between latitude 42° north and the mouth of the Columbia River; and Texas claims jurisdiction over a strip of Gulf water 3 leagues in width, adjacent to her coast and between the Rio Grande and the Sabine River.

United States district land offices.

Locations.	Established.	Opened.	Locations.	Established.	Opened.
Alabama:			Montana—Contd.		
Montgomery.....	July 10, 1832	Jan. 1, 1834	Missoula.....	Apr. 1, 1890	Apr. 20, 1891
Alaska:			Nebraska:		
Fairbanks.....	May 14, 1907	July 1, 1907	Allamore.....	Apr. 16, 1890	July 1, 1890
Juneau.....	Apr. 2, 1892	June 20, 1902	Broken Bow.....	do.....	July 7, 1890
Nome.....	May 14, 1907	July 1, 1907	Lincoln.....	July 7, 1893	Sept. 7, 1893
Arizona:			North Platte.....	Apr. 22, 1872	Apr. 11, 1873
Phoenix.....	July 25, 1905	Oct. 2, 1905	O'Neill.....	Apr. 7, 1883	July 16, 1883
Arkansas:			Valentine.....	June 19, 1882	July 7, 1883
Camden.....	Jan. 10, 1871	Mar. 20, 1871	Nevada:		
Harrison.....	July 14, 1870	Feb. 27, 1871	Carson City.....	July 2, 1892	Mar. 1, 1894
Little Rock.....	Feb. 17, 1818	Sept. 1, 1821	New Mexico:		
California:			Clayton.....	Dec. 18, 1888	Aug. 12, 1889
Eureka.....	Mar. 29, 1858	July 24, 1858	Fort Sumner.....	June 22, 1910	Oct. 1, 1910
Independence.....	Apr. 22, 1886	Mar. 22, 1887	Las Cruces.....	Mar. 10, 1883	May 1, 1883
Los Angeles.....	June 12, 1869	Sept. 22, 1869	Roswell.....	Mar. 1, 1889	Dec. 9, 1889
Redding.....	May 13, 1890	July 15, 1890	Santa Fe.....	May 24, 1858	Nov. 24, 1858
Sacramento.....	July 26, 1866	Nov. 12, 1867	Tucumcari.....	Mar. 16, 1908	July 1, 1908
San Francisco.....	Mar. 4, 1911	Mar. 1, 1911	North Dakota:		
Susanville.....	Feb. 10, 1871	Mar. 2, 1871	Bismarck.....	Apr. 24, 1874	Oct. 12, 1874
Visalia.....	Mar. 29, 1858	July 10, 1858	Devils Lake.....	Mar. 3, 1883	Aug. 24, 1883
Colorado:			Dickinson.....	Mar. 16, 1904	July 1, 1904
Del Norte.....	June 20, 1874	Mar. 22, 1875	Fargo.....	Dec. 29, 1873	Sept. 1, 1874
Denver.....	June 4, 1864	Aug. 15, 1864	Minot.....	Sept. 26, 1890	Oct. 1, 1891
Durango.....	Apr. 20, 1882	Oct. 2, 1882	Williston.....	Apr. 26, 1906	Aug. 1, 1906
Glenwood.....			Oklahoma:		
Spring.....	July 3, 1884	Nov. 10, 1884	El Reno.....	July 4, 1901	Aug. 6, 1901
Hugo.....	Feb. 6, 1890	Sept. 7, 1890	Guthrie.....	Mar. 3, 1883	Apr. 22, 1889
Lamar.....	Aug. 4, 1886	Jan. 3, 1887	Woodward.....	Aug. 25, 1893	Sept. 16, 1893
Leadville.....	Apr. 5, 1879	July 1, 1879	Oregon:		
Montrose.....	Jan. 4, 1888	Sept. 1, 1888	Burns.....	June 1, 1889	Sept. 2, 1889
Pueblo.....	May 27, 1870	Jan. 16, 1871	La Grande.....	July 3, 1866	Nov. 15, 1867
Sterling.....	Feb. 6, 1890	Aug. 1, 1890	Lakeview.....	June 6, 1877	Aug. 6, 1877
Florida:			Portland.....	Aug. 24, 1854	Jan. 1, 1855
Gainesville.....	June 8, 1872	Apr. 30, 1873	Roseburg.....	Sept. 15, 1859	Jan. 3, 1860
Idaho:			The Dalles.....	Jan. 11, 1875	June 1, 1875
Blackfoot.....	Sept. 3, 1886	Nov. 16, 1886	Vale.....	Mar. 15, 1910	July 1, 1910
Boise.....	July 26, 1866	Jan. 13, 1868	South Dakota:		
Coeur d'Alene.....	July 14, 1884	Dec. 21, 1885	Timber Lake.....	Feb. 12, 1911	May 1, 1911
Hailey.....	Jan. 24, 1883	July 16, 1883	Bellefourche.....	Feb. 6, 1909	July 1, 1909
Lewiston.....	July 26, 1866	Sept. 26, 1871	Chamberlain.....	Feb. 10, 1890	Apr. 3, 1890
Kansas:			Gregory.....	July 14, 1880	Jan. 3, 1882
Dodge City.....	Dec. 20, 1893	Feb. 3, 1894	Lemmon.....	May 29, 1908	Aug. 1, 1908
Topeka.....	July 24, 1861	Sept. 10, 1861	Pierre.....	Feb. 10, 1890	May 12, 1890
Louisiana:			Rapid City.....	Dec. 13, 1888	Jan. 15, 1889
Baton Rouge.....	Jan. 6, 1911	Apr. 1, 1911	Utah:		
Michigan:			Salt Lake City.....	July 16, 1868	Nov. 1, 1868
Marquette.....	Mar. 19, 1857	July 14, 1857	Vernal.....	May 9, 1905	July 1, 1905
Minnesota:			Washington:		
Cass Lake.....	Apr. 1, 1903	July 1, 1903	North Yakima.....	Apr. 11, 1885	Apr. 24, 1885
Crookston.....	Apr. 29, 1878	May 5, 1879	Olympia.....	May 16, 1890	Oct. 1, 1890
Duluth.....	Mar. 27, 1862	Jan. 15, 1863	Seattle.....	June 27, 1887	Dec. 3, 1887
Mississippi:			Spokane.....	June 23, 1883	Oct. 1, 1883
Jackson.....	June 23, 1836	July 25, 1836	Vancouver.....	May 16, 1890	July 3, 1891
Missouri:			Walla Walla.....	Mar. 3, 1871	July 17, 1871
Springfield.....	June 26, 1834	Oct. 4, 1838	Waterville.....	May 16, 1890	Nov. 6, 1890
Montana:			Wisconsin:		
Billings.....	Feb. 5, 1906	Oct. 2, 1906	Wausau.....	June 19, 1872	Aug. 19, 1872
Bozeman.....	June 20, 1874	July 5, 1874	Wyoming:		
Glasgow.....	Feb. 25, 1907	June 1, 1907	Buffalo.....	Mar. 3, 1887	May 1, 1888
Great Falls.....	May 8, 1902	Aug. 1, 1902	Cheyenne.....	Feb. 5, 1870	Aug. 10, 1870
Havre.....	Mar. 15, 1910	July 1, 1910	Douglas.....	Apr. 23, 1890	Nov. 1, 1890
Helena.....	Mar. 2, 1867	Apr. 27, 1867	Evanston.....	Aug. 9, 1876	Nov. 13, 1877
Kallispell.....	Mar. 2, 1897	July 1, 1897	Lander.....	Apr. 23, 1890	Nov. 8, 1890
Lewistown.....	Apr. 1, 1890	Nov. 26, 1890	Sundance.....	Apr. 8, 1890	Oct. 27, 1890
Miles City.....	Apr. 30, 1880	Oct. 19, 1880			

NOTE.—The land offices in Ohio, Indiana, Illinois, and Iowa are abolished, and the vacant tracts of public lands in those States are subject to entry and location at the General Land Office, Washington, D. C.

List of offices of United States surveyors general.

Locations.	Established.	Locations.	Established.
Alaska: Juneau.....	May 17, 1884	New Mexico: Santa Fe.....	Mar. 2, 1887
Arizona: Phoenix.....	Feb. 24, 1883	Oregon: Portland.....	July 17, 1854
California: San Francisco.....	Mar. 3, 1861	South Dakota: Huron.....	Apr. 10, 1890
Colorado: Denver.....	Feb. 28, 1861	Utah: Salt Lake City.....	July 16, 1868
Idaho: Boise.....	June 29, 1886	Washington: Olympia.....	July 17, 1854
Montana: Helena.....	July 2, 1864	Wyoming: Cheyenne.....	Feb. 5, 1870
Nevada: Reno.....	July 4, 1866		

Field division headquarters of special agents of General Land Office.

Field division:

- 1.....Portland, Oreg.
- 2.....San Francisco, Cal.
- 3.....Seattle, Wash.
- 4.....Helena, Mont.
- 5.....Denver, Colo.
- 6.....Los Angeles, Cal.

Field division—Continued.

- 7.....Cheyenne, Wyo.
- 8.....Duluth, Minn.
- 9.....Little Rock, Ark.
- 10.....Salt Lake City, Utah.
- 11.....Gainesville, Fla.
- 12.....Santa Fe, N. Mex.

Average number of employees of the General Land Office.

In General Land Office, Washington, D. C.....	532
In 13 offices of surveyors general.....	174
In 102 district land offices.....	414
In the field service.....	180
In the surveying service.....	102
In logging service.....	17
Total.....	1,419

Final homestead entries from the passage of the homestead act to June 30, 1912.

Fiscal year ended June 30—	Number.	Acres.	Fiscal year ended June 30—	Number.	Acres.
1898.....	2,772	355,086.04	1892.....	22,822	3,250,897.07
1899.....	3,905	504,301.97	1893.....	24,204	3,477,231.63
1870.....	4,041	519,727.84	1894.....	20,544	2,929,947.41
1871.....	5,087	629,162.25	1895.....	20,922	2,980,809.30
1872.....	5,917	707,409.83	1896.....	20,099	2,790,242.55
1873.....	10,311	1,224,890.93	1897.....	20,115	2,778,404.20
1874.....	14,129	1,585,781.56	1898.....	22,281	3,026,017.76
1875.....	18,393	2,068,537.74	1899.....	22,812	3,134,140.44
1876.....	22,530	2,590,552.81	1900.....	25,296	3,477,842.71
1877.....	19,000	2,407,828.19	1901.....	37,568	5,241,120.76
1878.....	22,460	2,662,980.82	1902.....	31,627	4,342,747.70
1879.....	17,391	2,070,842.39	1903.....	26,373	3,576,964.14
1880.....	15,441	1,938,234.89	1904.....	23,932	3,232,716.75
1881.....	15,077	1,928,204.76	1905.....	24,621	3,419,387.15
1882.....	17,174	2,219,453.80	1906.....	25,546	3,526,748.58
1883.....	18,098	2,504,414.51	1907.....	26,485	3,740,567.71
1884.....	21,843	2,945,574.72	1908.....	29,636	4,242,710.59
1885.....	22,666	3,032,679.11	1909.....	25,510	3,600,466.79
1886.....	19,366	2,663,531.83	1910.....	23,263	3,795,862.89
1887.....	19,866	2,749,037.48	1911.....	25,908	4,620,197.12
1888.....	22,413	3,175,400.64	1912.....	24,326	4,306,068.52
1889.....	25,549	3,681,708.80			
1890.....	28,080	4,060,592.77	Total.....	924,215	127,846,424.21
1891.....	27,666	3,954,587.77			

Timber and stone entries from the passage of the act of June 3, 1878, to June 30, 1912.

States or Territories.	Number of entries.	Acres.	Amount received.	States or Territories.	Number of entries.	Acres.	Amount received.
Alabama.....	258	20,839.34	\$55,950.30	Nebraska.....	1	97.20	\$243.00
Arizona.....	3	200.00	500.00	Nevada.....	49	6,222.32	15,558.19
Arkansas.....	2,181	292,336.48	588,116.96	North Dakota..	81	8,566.90	21,807.25
California.....	19,680	2,776,019.27	6,980,338.43	Oklahoma.....	1	40.00	100.00
Colorado.....	2,747	339,836.29	859,717.04	Oregon.....	25,730	3,678,835.19	9,287,637.01
Florida.....	851	97,131.65	264,906.11	South Dakota..	529	58,384.78	149,028.81
Idaho.....	7,197	969,184.14	2,492,714.54	Utah.....	21	2,121.21	4,993.09
Iowa.....	3	119.36	298.40	Washington....	15,856	2,109,788.07	5,322,752.02
Louisiana.....	1,541	136,683.61	338,175.55	Wisconsin.....	1,080	77,854.67	196,111.45
Michigan.....	1,594	122,774.97	335,502.45	Wyoming.....	3,259	368,967.77	909,224.04
Minnesota.....	12,065	1,362,639.74	3,427,642.23				
Mississippi.....	80	6,795.82	14,512.19				
Montana.....	4,769	618,191.28	1,575,104.00	Total.....	99,535	12,059,658.06	32,839,932.56

Desert-land entries from the passage of the act of Mar. 3, 1877, to June 30, 1912.

States or Territories.	Entries.		Area.		Amount.		
	Original.	Final.	Original.	Final.	Original.	Final.	Total.
			<i>Acres.</i>	<i>Acres.</i>			
Arizona.....	6,006	901	1,928,879.91	246,392.88	\$484,784.69	\$280,234.06	\$765,018.64
California.....	16,366	2,813	3,758,628.74	560,468.96	954,692.21	853,538.67	1,538,230.89
Colorado.....	15,218	2,811	2,860,387.82	406,161.34	715,688.96	406,006.46	1,120,694.41
Dakota Territory	35	1	20,021.00	300.00	5,008.25	300.00	5,308.25
Idaho.....	15,157	3,134	2,644,391.06	714,473.88	690,777.24	667,968.14	1,373,865.28
Montana.....	28,619	10,990	5,466,749.01	2,106,224.27	1,372,485.38	2,119,090.12	3,491,575.50
Nevada.....	1,090	23	394,684.53	53,152.54	98,910.82	53,085.41	151,996.23
New Mexico.....	10,126	1,184	1,967,063.90	167,501.52	498,592.72	267,416.45	761,008.17
North Dakota..	514	101	84,958.51	16,937.15	21,241.09	17,001.89	38,242.98
Oregon.....	5,655	1,229	972,314.40	207,530.18	242,774.84	206,475.09	449,249.93
South Dakota..	3,749	378	571,483.25	65,592.33	142,190.44	65,752.27	207,942.71
Utah.....	7,089	1,858	1,259,744.54	303,361.90	321,715.71	309,160.73	630,876.44
Washington....	5,350	439	896,993.41	47,718.64	235,689.20	61,468.12	297,157.32
Wyoming.....	15,445	5,376	3,456,296.02	1,203,391.32	870,866.88	1,212,082.74	2,082,949.62
Total.....	131,518	31,947	26,104,585.09	6,218,509.91	6,620,416.12	6,261,237.53	12,881,653.65

Timber-culture entries from the passage of the act of Mar. 3, 1873, to June 30, 1912.

States or Territories.	Entries.			Area.			Amount.			
	Original.	Final.	Committed.	Original.	Final.	Committed.	Fees (original).	Fees (final).	Purchase money.	Total.
Arizona.....	1,152	52	74	Acres.	7,149.14	10,228.42	\$15,224.00	\$208.00	\$12,779.26	\$28,211.26
Arkansas.....	41	4	1		7,480.00	40.00	489.00	16.00	44.00	\$26,549.00
California.....	8,264	480	567	1,153,922.03	63,411.58	78,728.76	110,014.00	1,904.00	95,469.13	210,417.13
Colorado.....	27,864	3,759	600	4,332,922.19	585,243.30	98,179.52	384,838.00	15,114.00	122,722.36	\$22,814.36
Dakota Territory.....	77,446	1,309		12,055,642.98	185,467.24		1,074,862.44	4,964.79		1,079,847.23
Florida.....	3			430.00			42.00			42.00
Idaho.....	4,054	341	236	533,957.49	40,436.03	28,244.51	51,447.38	1,369.50	36,305.92	86,122.81
Iowa.....	1,044	390	39	81,378.95	31,987.87	2,292.17	11,538.83	1,560.00	2,965.22	16,394.05
Kansas.....	64,345	12,886	961	9,702,538.36	2,035,831.35	142,031.88	883,275.56	51,529.03	178,650.55	1,113,456.14
Louisiana.....	713	87	42	1,011,645.31	11,837.97	6,864.85	9,651.58	348.00	7,260.64	17,209.09
Minnesota.....	15,268	2,924	389	2,099,046.35	373,580.40	40,261.29	207,154.98	11,712.00	61,543.77	260,410.75
Montana.....	3,595	407	225	486,638.66	56,019.73	29,044.43	46,162.00	1,632.00	36,506.22	84,200.22
Nebraska.....	59,127	16,870	1,250	8,876,351.20	2,546,694.04	187,371.35	813,382.33	67,776.73	294,332.61	1,115,491.67
Nevada.....	46			6,292.50	160.00		614.00	4.00		618.00
New Mexico.....	1,612	91	55	230,316.54	12,831.60	7,837.25	21,294.00	363.00	9,794.56	31,452.56
North Dakota.....	1,609	7,867	781	263,123.95	1,226,605.66	120,524.80	23,446.00	31,576.83	150,661.75	205,694.58
Oregon.....	7,126	1,502	252	1,051,235.21	224,545.40	35,902.61	96,821.00	6,028.00	44,878.37	146,721.37
South Dakota.....	2,925	13,764	821	449,553.61	2,124,753.58	121,790.98	40,151.00	55,036.00	152,062.80	247,269.59
Utah.....	1,476		89	179,690.74	15,556.26	10,157.44	17,926.00	5,552.00	12,066.85	31,173.85
Washington.....	9,354	2,006	538	1,362,193.51	292,727.52	75,689.54	126,615.00	8,020.00	94,770.83	228,404.83
Wyoming.....	3,123	332	125	459,556.42	50,383.08	15,288.29	41,904.00	1,328.00	19,135.91	62,367.91
Total.....	290,278	65,263	7,105	43,605,344.97	9,855,944.45	1,010,306.09	3,975,261.07	261,106.86	1,274,671.85	5,811,032.90

Coal-land entries from the passage of the act of Mar. 3, 1873, to June 30, 1912.

States or Territories.	Entries.	Acres.	Amount.	States or Territories.	Entries.	Acres.	Amount.
Alabama.....	2	239.40	\$2,394.00	New Mexico.....	198	23,349.22	\$367,097.40
Alaska ¹	159	37,011.81	370,118.58	North Dakota....	131	7,891.71	119,442.40
Arizona.....	24	3,828.39	46,283.90	Oregon.....	87	9,043.33	96,140.30
California.....	38	5,535.06	81,631.80	South Dakota....	38	2,693.74	28,737.40
Colorado.....	1,026	154,442.72	2,165,967.20	Utah.....	409	58,248.73	1,269,249.76
Colorado ²	433	56,786.77	840,838.90	Washington.....	364	57,047.76	865,210.20
Dakota ³	8	583.57	5,835.70	Wyoming.....	708	102,666.83	2,004,793.86
Idaho.....	9	2,002.84	20,031.80				
Montana.....	372	54,328.37	951,304.90	Total.....	3,982	576,280.36	9,263,109.79
Nevada.....	6	680.11	8,402.20				

¹ The showing of 159 "entries" in this table includes locations on which final certificates have issued and those on which payment has been made but for which receiver's receipt only has issued. There are only 35 coal claims in Alaska on which final certificates have issued to date, which carry an area of 5,446,348 acres, for which there has been paid \$54,468.48. No coal claims have been patented. This explanation is made in view of the fact that in prior reports all proofs upon which payments were made were given as entries.

² Within the Ute Indian Reservation.

³ Territory.

Land concessions by acts of Congress to States and corporations for railroad and military wagon-road purposes from the year 1850 to June 30, 1912.

STATE GRANTS.

	Acres.
Illinois:	
Illinois Central.....	2,595,133.00
Mississippi:	
Mobile & Ohio River.....	¹ 737,130.29
Vicksburg & Meridian.....	199,101.51
Gulf & Ship Island.....	139,113.22
	<u>1,075,345.02</u>
Alabama:	
Mobile & Ohio River.....	¹ 419,528.44
Alabama & Florida.....	399,022.84
Selma, Rome & Dalton.....	458,555.82
Coosa & Tennessee.....	67,784.96
Mobile & Girard.....	² 302,181.16
Alabama & Chattanooga.....	653,888.76
South & North Alabama.....	445,438.43
	<u>2,746,400.41</u>
Florida:	
Florida Central & Peninsular.....	730,353.55
Florida & Alabama.....	166,691.08
Pensacola & Georgia.....	1,279,236.70
Florida, Atlantic & Gulf Central.....	29,384.18
	<u>2,205,665.51</u>
Louisiana:	
Vicksburg, Shreveport & Pacific.....	467,654.02
New Orleans, Opelousas & Great Western.....	(³)

¹ In the adjustment of this grant the road was treated as an entirety and without reference to the State line, hence Alabama has had approved to her more and Mississippi less than they would appear to be entitled to in proportion to the length of the road in the respective States.

² This grant was adjusted Apr. 24, 1893, and 302,181.16 acres were allotted to the company. The balance of the previously certified lands were ordered restored to entry under the forfeiture act of Sept. 29, 1890.

³ Certified lands, footing 719,189.79 acres, were reconveyed to the United States by the governor of Louisiana Feb. 24, 1888 the grant having been forfeited by the act of July 14, 1870 (16 Stat., 277).

		Acres.
Arkansas:		
St. Louis, Iron Mountain & Southern.....		1,325,355.46
Little Rock & Fort Smith.....		1,052,082.51
Memphis & Little Rock.....		184,657.83
		2,562,095.80
Missouri:		
Southwest branch of the Pacific road		1,161,284.51
Hannibal & St. Joseph.....		611,323.35
St. Louis, Iron Mountain & Southern.....		65,120.31
		1,837,728.17
Iowa:		
Burlington & Missouri River.....		389,990.11
Chicago, Rock Island & Pacific.....		¹ 483,214.36
		161,532.81
Cedar Rapids & Missouri River.....		¹ 922,813.67
		244,022.96
Dubuque & Sioux City.....		¹ 556,406.74
Iowa Falls & Sioux City.....		683,057.54
Des Moines Valley.....		840,091.36
Chicago, Milwaukee & St. Paul.....		326,216.10
McGregor & Missouri River.....		322,412.81
Sioux City & St. Paul.....		
		4,929,758.26
Michigan:		
Port Huron & Lake Michigan.....		37,467.44
Jackson, Lansing & Saginaw.....		743,787.58
Grand Rapids & Indiana.....		852,521.10
Flint & Pere Marquette.....		512,877.03
Marquette, Houghton & Ontonagon.....		² 305,929.59
Ontonagon & Brule River.....		34,227.08
Bay de Noquet & Marquette.....		128,301.05
Chicago & North Western.....		518,065.36
		3,133,176.23
Wisconsin:		
Chicago, St. Paul, Minneapolis & Omaha (formerly West Wisconsin).....		813,706.71
Wisconsin Railroad Farm Mortgage Land Co.....		163,159.65
Chicago, St. Paul, Minneapolis & Omaha (formerly St. Croix & Lake Superior).....		816,487.76
Branch to Bayfield.....		471,721.14
Chicago & North Western.....		546,446.20
Wisconsin Central.....		838,227.69
		3,649,749.15
Minnesota:		
St. Paul, Minneapolis & Manitoba (formerly first division, St. Paul & Pacific).....		³ 3,256,477.73
Western Railroad (succeeded by St. Paul & Northern Pacific Railroad Co.).....		
St. Paul, Minneapolis & Manitoba (formerly St. Vincent extension of the St. Paul & Pacific).....		

¹ Includes 35,665.40 acres of the Chicago, Rock Island & Pacific R. R.; 109,756.85 acres of the Cedar Rapids & Missouri River R. R.; and 77,535.22 acres of the Dubuque & Sioux City R. R., situated in the old Des Moines River grant of Aug. 8, 1846, which should be deducted from the foregoing amount. (Wolcott v. Des Moines Co., 5 Wall., 631.)

² Excess of 131,481.71 acres originally certified under this grant reconveyed by State or entered under act Mar. 3, 1887, by Michigan Land & Iron Co. (Ltd.), grant having been forfeited in part by act Mar. 2, 1889 (26 Stat., 1008).

³ Declared to be one grant. (See 32 L. D., 21.)

Minnesota—Continued.

	Acres.
Minnesota Central.....	179, 734. 29
Winona & St. Peter.....	1, 680, 974. 92
St. Paul & Sioux City.....	1, 126, 578. 55
St. Paul & Duluth.....	860, 973. 62
Southern Minnesota, from a point on the Mississippi River to Houston.....	546, 745. 44
Southern Minnesota, extension (now Chicago, Milwaukee & St. Paul).....	
Hastings & Dakota.....	377, 776. 15
	8, 028, 999. 95

Minnesota, North Dakota, Montana, Washington.*

St. Paul, Minneapolis & Manitoba, now Great Northern (main and branch), a special act (Aug. 5, 1892, 27 Stat. L., 390) to provide for indemnity for lands relinquished by the company.....

(1)

Kansas:

Leavenworth, Lawrence & Galveston.....	249, 446. 13
Missouri, Kansas & Texas.....	976, 593. 22
Atchison, Topeka & Santa Fe.....	2, 944, 788. 14
St. Joseph & Denver City.....	462, 933. 24
	4, 633, 760. 73

Grand total of State grants..... 37, 864, 726. 48

CORPORATION GRANTS.

Union Pacific.....	11, 930, 685. 95
Central Pacific.....	5, 842, 717. 72
Central Pacific (successor by consolidation with Western Pacific).....	458, 147. 97
Central Branch Union Pacific.....	223, 080. 50
Union Pacific (Kansas division).....	6, 175, 660. 63
Union Pacific (successor to Denver Pacific Ry. Co.).....	807, 564. 76
Burlington & Missouri River in Nebraska.....	2, 374, 090. 77
Sioux City & Pacific (now Missouri Valley Land Co.).....	42, 610. 95
Northern Pacific.....	33, 294, 334. 48
Oregon Branch of the Central Pacific (California & Oregon).....	3, 154, 994. 16
Oregon & California.....	2, 765, 677. 10
Atlantic & Pacific (now Santa Fe Pacific).....	4, 280, 502. 45
Southern Pacific (main line).....	3, 677, 509. 83
Southern Pacific (branch line).....	1, 451, 281. 08
Oregon Central.....	128, 618. 13
New Orleans Pacific.....	1, 001, 783. 27

Grand total to corporations..... 77, 609, 259. 75

WAGON ROADS.

From Lake Erie to Connecticut Western Reserve.....	80, 773. 54
From Lake Michigan to Ohio River.....	170, 580. 24
From Fort Wilkins, Copper Harbor, Mich., to Green Bay, Wis.....	302, 930. 96
From Fort Wilkins, Copper Harbor, to Wisconsin State line.....	221, 013. 35
Oregon Central Military Co. (now California & Oregon Land Co.).....	673, 156. 07
Corvallis & Yaquina Bay.....	81, 895. 25
Willamette Valley and Cascade Mountain.....	861, 511. 86
Dalles Military Road.....	556, 827. 04
Coos Bay Military Road.....	105, 240. 11
Grand total.....	3, 053, 928. 42

* See Minnesota for original grants.

* Includes 156,936.72 acres of the "Osage ceded reservation," which are to be deducted from the above amount under the decision of the Supreme Court in the case of the Leavenworth, Lawrence & Galveston Railroad v. The United States (92 U. S., 733).

* Includes 270,970.78 acres in the "Osage ceded reservation," which are to be deducted under the decision cited in note 3.

Withdrawals under the act of Mar. 15, 1910, from the passage of the act to June 30, 1912.

State.	Amount applied for.	Rejected or eliminated before withdrawal.	Withdrawn.	Restored.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Colorado.....	911,190.98	46,648.49	311,475.90	232,399.13
Idaho.....	342,453.84	34,208.80	232,528.09	208,874.21
Montana.....	110,027.61	37,063.83	32,976.29	32,976.29
Nevada.....	1,021,206.73	304,854.52	271,149.84	270,957.74
New Mexico.....	383,951.62	56.36	10,000.00	10,000.00
Oregon.....	595,518.37	203,455.90	206,080.33	156,533.72
Utah.....	242,653.23	80.88	158,676.77	167,611.07
Wyoming.....	230,596.95	16,084.24	73,820.42	591.18
Total.....	3,837,395.36	643,047.02	1,385,685.64	1,092,973.29

State desert-land segregation under section 4 of the act of Aug. 18, 1894 (28 Stat., 372-422), and the acts amendatory thereof, commonly known as the Carey Act, with the action taken thereon from the passage of the act to June 30, 1912.

State.	Applied for.	Segregated.	Rejected or relinquished.	Patented.	Reconveyed.	Time to reclaim extended.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Colorado.....	373,593.56	272,197.98	46,221.77	.....	.....	.....
Idaho.....	3,106,994.17	1,298,541.63	577,609.93	285,995.68	.....	51,178.46
Montana.....	554,432.63	200,597.06	373,206.74	25,653.03	10,104.03	62,604.95
Nevada.....	163,780.05	36,383.59	47,229.35	.....	.....	.....
New Mexico.....	10,164.68	7,564.68	2,600.00	.....	.....	.....
Oregon.....	738,163.60	338,617.19	229,647.12	51,583.13	6,014.49	.....
Utah.....	435,170.02	136,820.63	267,980.83	.....	.....	.....
Washington.....	155,649.39	.....	155,649.39	.....	.....	.....
Wyoming.....	1,765,079.48	999,083.61	360,400.66	100,767.67	3,977.23	17,397.53
Total.....	7,301,036.58	3,291,231.37	2,300,545.79	473,999.51	20,096.75	131,180.94

Public and Indian lands entered each year ended June 30, from 1906 to 1912, inclusive.

States or Territories.	1906	1907	1908	1909	1910	1911	1912
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Alabama.....	102,621.51	92,530.30	81,228.56	50,930.86	47,353.42	49,618.88	90,615.04
Alaska.....	4,926.86	7,132.16	3,834.80	10,772.38	17,506.03	15,477.69	5,244.95
Arizona.....	107,054.87	86,121.64	198,509.64	408,180.64	541,793.23	486,066.98	609,292.97
Arkansas.....	441,530.07	496,015.40	333,676.41	171,316.50	137,637.78	201,006.00	247,318.58
California.....	809,811.28	679,294.93	766,932.96	1,290,579.46	1,214,348.36	1,064,644.39	872,301.68
Colorado.....	1,897,010.38	2,483,666.09	2,127,661.99	1,983,078.58	1,994,757.50	2,272,068.99	1,354,326.05
Florida.....	166,068.73	109,663.03	83,072.78	125,744.66	121,837.68	144,809.48	183,061.64
Idaho.....	734,763.70	1,162,745.25	1,087,402.94	1,383,443.88	1,768,010.34	1,191,012.91	890,840.25
Illinois.....	40.00	296.30	40.00	.....	.....	.....	.....
Indiana.....	.....	129.70	10.06	40.00	.....	.....	.....
Iowa.....	967.93	195.65	1,433.69	564.04	160.02	.....	.....
Kansas.....	609,438.67	611,728.97	332,931.81	166,375.14	157,311.36	122,810.19	71,915.09
Louisiana.....	30,098.61	59,008.79	59,450.26	39,428.40	22,344.86	24,432.63	16,491.13
Michigan.....	38,696.10	42,828.40	46,147.59	33,813.58	19,612.94	17,196.17	17,222.67
Minnesota.....	397,567.07	324,418.22	429,351.12	385,816.56	285,177.03	239,630.59	397,158.46
Mississippi.....	75,856.78	55,646.26	35,545.87	35,903.88	29,339.15	34,440.75	27,708.14
Missouri.....	101,428.89	184,871.72	129,157.20	53,560.91	52,508.68	19,292.74	21,968.55
Montana.....	1,782,278.90	1,218,789.97	1,494,062.02	2,460,905.56	6,616,734.69	4,659,232.43	3,687,420.90
Nebraska.....	1,736,984.79	1,786,782.91	1,781,823.80	1,978,872.10	1,638,486.72	1,606,594.61	1,894,893.67
Nevada.....	228,904.38	47,254.03	60,131.50	78,190.07	261,125.24	312,610.88	261,188.07
New Jersey.....	90.03	.....	.....	.....	.....	.....	.....
New Mexico.....	1,238,080.39	758,008.91	880,837.11	2,642,799.19	1,924,145.46	1,877,963.07	1,050,899.79
North Dakota.....	3,328,826.22	254,423.56	1,393,957.19	877,049.71	807,512.19	518,357.48	384,215.11
Oklahoma.....	1,426,360.46	907,753.94	514,159.58	297,872.36	193,692.96	146,000.50	97,563.81
Oregon.....	617,293.21	951,481.34	1,021,001.29	1,081,830.56	1,050,723.53	742,049.87	715,899.45
South Dakota.....	1,707,684.39	1,602,411.22	1,086,171.82	2,219,560.32	2,946,827.85	1,711,629.43	806,546.70
Utah.....	413,030.21	334,827.36	469,311.88	619,802.07	677,459.86	683,770.06	546,883.11
Washington.....	989,907.66	911,377.34	825,813.67	608,544.35	560,739.29	431,459.19	382,565.67
Wisconsin.....	55,592.44	28,966.92	57,696.61	19,061.18	17,007.33	17,970.28	16,099.44
Wyoming.....	534,431.64	397,679.59	829,614.19	897,479.96	1,377,063.74	1,167,042.50	503,090.10
Total.....	19,431,187.47	20,997,566.58	19,000,356.78	19,892,503.76	26,391,269.09	19,211,372.27	14,574,688.82

Unappropriated lands on June 30, 1912.

[A circular showing area unappropriated, by counties, is distributed on request.]

States or Territories.	Area unappropriated and unreserved.			States or Territories.	Area unappropriated and unreserved.		
	Surveyed.	Unsurveyed.	Total.		Surveyed.	Unsurveyed.	Total.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>		<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Alabama.....	93,040	1,600	94,640	Montana.....	13,097,086	15,356,909	29,053,995
Alaska.....		1368,010,643	368,010,643	Nebraska.....	832,750		832,750
Arizona.....	12,003,186	28,592,537	40,595,723	Nevada.....	28,844,824	26,230,679	55,075,503
Arkansas.....	436,210	82,000	518,210	New Mexico.....	22,241,833	11,329,650	33,571,483
California.....	17,671,839	5,845,499	23,517,338	North Dakota.....	1,354,571		1,354,571
Colorado.....	17,684,401	1,564,797	19,249,198	Oklahoma.....	39,325		39,325
Florida.....	240,408		385,939	Oregon.....	13,141,621	3,746,148	16,888,069
Idaho.....	7,172,856	11,757,537	18,930,393	South Dakota.....	4,039,392	81,920	4,121,812
Kansas.....	91,328		91,328	Utah.....	12,011,621	22,037,256	34,049,177
Louisiana.....	69,198		69,198	Washington.....	1,106,783	761,306	1,868,089
Michigan.....	92,544		92,544	Wisconsin.....	11,520		11,520
Minnesota.....	1,525,775		1,525,775	Wyoming.....	30,905,022	2,570,720	33,475,742
Mississippi.....	52,400		52,400				
Missouri.....	1,197		1,197	Grand total.	185,362,030	407,622,732	682,984,762

¹ The unreserved lands in Alaska are mostly unsurveyed and unappropriated.*Public lands surveyed and remaining unsurveyed.*

States or Territories.	Land area.	Surveyed during fiscal year ended June 30, 1912.	Surveyed to June 30, 1912.	Unsurveyed.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Alabama.....	32,818,560		32,818,560	
Alaska.....	378,165,760	23,004	139,717	378,126,043
Arizona.....	72,857,600	294,544	21,573,024	51,284,576
Arkansas.....	33,616,000		33,616,000	
California.....	99,898,880	259,310	78,609,578	21,289,302
Colorado.....	66,341,120	55,872	63,233,329	3,107,791
Florida.....	35,111,040		30,912,571	4,198,469
Illinois.....	35,841,280		35,841,280	
Indiana.....	22,966,400		22,966,400	
Iowa.....	35,575,040		35,575,040	
Idaho.....	53,618,560	761,800	27,811,599	25,806,961
Kansas.....	52,335,360		52,335,360	
Louisiana.....	29,061,760	3,904	27,181,384	1,880,376
Michigan.....	36,787,200		36,787,200	
Minnesota.....	51,749,120		49,822,176	1,926,944
Mississippi.....	29,671,680		29,671,680	
Missouri.....	43,985,280		43,985,280	
Montana.....	93,296,640	2,316,819	60,616,942	32,679,698
Nebraska.....	49,157,120		49,157,120	
Nevada.....	70,285,440	140,334	39,845,604	30,439,836
New Mexico.....	78,401,920	263,657	54,031,490	24,370,430
North Dakota.....	44,917,120	191,998	42,769,192	2,147,928
Ohio.....	26,073,600		26,073,600	
Oregon.....	61,138,480	331,419	49,681,569	11,556,911
Oklahoma.....	44,424,960		44,424,960	
South Dakota.....	49,195,520	65,951	49,180,347	15,170
Utah.....	52,597,760	1,138,846	27,745,609	24,852,151
Wisconsin.....	35,363,840		35,363,840	
Washington.....	42,775,040	809,349	33,183,824	9,591,216
Wyoming.....	62,460,160	1,118,289	58,466,339	3,993,821
Total.....	1,820,538,240	7,775,096	1,193,320,614	627,217,623

¹ Nearly 300,000 acres of Alaska surveys have been executed in the field, but returns are not completed.

Estimated area of existing national forests June 30, 1912.

(Approximately 87 per cent is public.)

	Acres.		Acres.
Alaska.....	26,748,850	Nevada.....	5,555,510
Arizona.....	13,339,390	New Mexico.....	10,173,890
Arkansas.....	2,225,890	North Dakota.....	13,920
California.....	27,567,075	Oklahoma.....	61,640
Colorado.....	14,735,460	Oregon.....	16,023,420
Florida.....	674,970	Porto Rico.....	65,950
Idaho.....	19,550,827	South Dakota.....	1,337,750
Kansas.....	303,937	Utah.....	7,721,083
Michigan.....	163,771	Washington.....	11,684,360
Minnesota.....	1,204,750	Wyoming.....	8,633,463
Montana.....	19,063,770		
Nebraska.....	556,700	Total area.....	187,406,376

	Acres.
Area added to national forests during year.....	238,385
Area excluded from national forests during year.....	3,440,252
Area embraced in temporary forest withdrawals June 30, 1912.....	1,384,865

Area of existing national forests June 30, 1911.....	190,608,243
Area of existing national forests June 30, 1912.....	187,406,376

Decrease in area during fiscal year ended June 30, 1912..... 3,201,867

National monuments.

State and name.	Date created.	Area.	State and name.	Date created.	Area.
Alaska:		Acres.	New Mexico:		Acres.
Sitka.....	Mar. 23, 1910	¹ 57.00	Chaco Canyon....	Mar. 11, 1907	20,629.40
Arizona:			El Morro.....	Dec. 8, 1906	160.00
Grand Canyon ² ...	Jan. 11, 1908	¹ 806,400.00	Gila Cliff Dwellings ² ...	Nov. 16, 1907	160.00
Montezuma Castle.....	Dec. 8, 1906	160.00	Gran Quivira.....	Nov. 1, 1909	¹ 160.00
Navajo.....	Mar. 20, 1909	360.00	Oregon:		
Tonto ²	Dec. 19, 1907	¹ 640.00	Oregon Caves ² ...	July 12, 1909	¹ 480.00
Tumacacori.....	Sept. 15, 1908	10.00	South Dakota:		
Petrified Forest....	July 31, 1911	² 26,625.60	Jewel Cave ²	Feb. 7, 1908	¹ 1,280.00
California:			Utah:		
Cinder Cone ²	May 6, 1907	¹ 5,120.00	Mukuntuweap....	July 31, 1909	¹ 15,840.00
Lassen Peak ²	do.....	¹ 1,280.00	Natural Bridges..	Sept. 25, 1909	² 2,740.00
Muir Woods.....	Jan. 9, 1908	296.00	Rainbow Bridge..	May 30, 1910	160.00
Pinnacles.....	Jan. 16, 1908	¹ 2,080.00	Washington:		
Devil Postpile ² ...	July 6, 1911	¹ 800.00	Mount Olympus ² ...	Mar. 2, 1909	¹ 608,480.00
Colorado:			Wyoming:		
Wheeler ²	Dec. 7, 1908	¹ 300.00	Devils Tower....	Sept. 24, 1906	1,152.91
Colorado.....	May 24, 1911	13,883.06	Shoshone Cavern..	Sept. 21, 1909	210.00
Montana:			Total.....		1,508,627.97
Big Hole.....	June 23, 1910	5.00			
Lewis and Clark Cavern.....	May 16, 1911	² 160.00			

¹ Estimated area.² Under jurisdiction of Department of Agriculture.³ According to second proclamation.

Aggregate cash receipts from the disposal of public and Indian lands from May 20, 1785, to June 30, 1912.

Fiscal years.	Cash sales.	Amount of fees and commissions.	Total receipts from disposal of public lands.	Receipts from sales of Indian lands.	Miscellaneous receipts.	Aggregate receipts from all sources.
May 20, 1785, to June 30, 1880.						\$208,059,657.14
1881.	\$3,534,550.98	\$860,833.65	\$4,395,384.63	\$1,006,691.63	\$6,727.90	5,408,804.16
1882.	6,628,775.92	1,124,531.15	7,753,307.07	634,617.22	6,591.75	8,394,516.04
1883.	9,657,032.28	1,423,329.10	11,080,361.38	625,404.27	8,118.05	11,713,883.70
1884.	10,304,582.49	1,536,410.58	11,840,993.07	935,137.26	10,274.76	12,789,405.09
1885.	6,223,926.74	1,462,188.06	7,686,114.80	933,483.52	8,821.89	8,628,420.18
1886.	5,757,891.06	1,654,876.25	7,412,767.31	1,607,729.63	10,587.40	9,031,084.34
1887.	9,246,321.33	1,537,600.39	10,783,921.72	1,484,302.30	20,784.85	12,289,008.87
1888.	11,203,071.95	1,498,000.05	12,701,072.00	821,113.77	24,951.65	13,547,137.42
1889.	8,018,254.50	1,251,971.23	9,270,225.73	389,624.72	26,150.89	9,685,901.34
1890.	6,349,174.24	1,121,696.07	7,470,870.31	293,062.30	16,585.00	7,780,517.61
1891.	4,160,099.07	944,938.65	5,105,037.72	318,333.42	5,849.00	5,429,220.14
1892.	3,322,865.01	1,064,805.26	4,387,670.27	456,681.84	15,757.58	4,860,109.69
1893.	3,193,280.64	998,184.65	4,191,465.29	284,752.65	3,516.20	4,479,734.14
1894.	1,653,080.71	1,021,205.08	2,674,285.79	91,981.03	1,557.50	2,767,824.32
1895.	1,116,090.07	750,710.59	1,866,800.66	149,879.48	16,773.89	2,033,454.03
1896.	1,053,905.59	793,557.82	1,847,463.41	214,700.42	44,197.84	2,106,361.67
1897.	917,911.19	678,469.55	1,596,380.74	438,716.31	52,834.23	2,087,931.28
1898.	1,291,076.10	1,157,081.03	2,448,157.13	100,317.49	33,336.09	2,277,995.18
1899.	1,703,988.32	890,702.17	2,594,690.49	442,913.73	32,533.12	3,070,137.34
1900.	2,899,731.83	1,157,081.03	4,056,812.86	239,769.39	83,175.85	4,379,758.10
1901.	2,966,542.86	1,340,894.29	4,307,437.15	585,661.27	79,062.37	4,972,160.79
1902.	4,139,268.47	1,740,820.18	5,880,088.65	288,666.68	93,171.85	6,261,927.18
1903.	8,960,471.18	1,597,147.48	10,557,618.66	308,039.14	158,185.85	11,024,743.65
1904.	7,445,902.84	1,349,990.89	8,795,893.73	333,757.62	153,690.63	9,283,341.98
1905.	4,849,766.06	1,286,621.93	6,136,387.88	791,807.67	89,615.72	7,017,811.38
1906.	4,885,988.82	1,642,488.56	6,528,477.38	967,532.50	89,514.02	7,585,523.90
1907.	7,728,114.30	1,819,159.21	9,547,273.51	1,892,805.70	113,098.79	11,553,178.00
1908.	9,760,570.19	1,731,883.57	11,492,453.76	997,972.52	225,283.18	12,715,709.46
1909.	7,698,337.03	1,536,890.67	9,235,227.70	2,334,885.47	330,136.61	12,216,415.39
1910.	6,342,744.75	2,028,892.35	8,371,637.10	2,037,551.68	1,054,735.28	11,463,924.06
1911.	5,783,693.39	1,461,514.30	7,245,207.69	2,822,600.71	11,022,119.20	11,089,927.60
1912.	5,437,502.07	1,234,216.47	6,671,718.54	2,284,538.37	11,016,791.09	9,973,048.00
Total....						455,978,573.17

Includes reclamation water-right charges.

Amounts accrued and paid to States on account of grants of 2, 3, and 5 per cent of net proceeds of sales of public lands for purposes of education or of making public roads and improvements.

State.	Total to June 30, 1910.	Fiscal year 1911.	Aggregate to June 30, 1911, inclusive.
Alabama.....	\$1,076,404.03	\$901.29	\$1,077,305.32
Arkansas.....	319,032.92	4,864.92	323,897.84
California.....	1,048,614.93	14,083.51	1,062,698.44
Colorado.....	429,227.12	16,165.94	445,393.06
Florida.....	131,239.38	1,920.41	133,159.79
Idaho.....	220,163.89	11,178.12	231,342.01
Illinois.....	1,187,908.89	.....	1,187,908.89
Indiana.....	1,040,255.26	.....	1,040,255.26
Iowa.....	633,638.10	.....	633,638.10
Kansas.....	1,118,426.51	3,927.04	1,122,353.55
Louisiana.....	467,432.81	429.25	467,862.06
Michigan.....	586,579.96	203.68	586,783.64
Minnesota.....	582,077.05	3,959.64	586,036.69
Mississippi.....	1,069,843.91	.....	1,069,843.91
Missouri.....	1,058,970.43	790.31	1,059,760.74
Montana.....	352,310.65	34,336.35	386,647.00
Nebraska.....	544,915.02	6,473.11	551,388.13
Nevada.....	25,984.82	3,533.99	29,518.81
New Mexico.....	95,369.71	15,083.76	110,453.47
North Dakota.....	473,354.64	31,908.11	505,262.75
Ohio.....	999,353.01	.....	999,353.01
Oklahoma.....	50,127.86	5,828.20	55,956.06
Oregon.....	688,902.14	12,786.67	701,687.81
South Dakota.....	213,506.12	49,977.18	263,483.30
Utah.....	71,566.56	4,264.22	75,830.78
Washington.....	380,718.96	10,184.61	390,903.57
Wisconsin.....	586,137.00	166.50	586,303.50
Wyoming.....	174,627.62	14,896.95	189,524.57
Total.....	15,606,721.90	247,855.76	15,854,577.66

Amounts covered into the Treasury to the credit of the reclamation fund from the sales of public lands and fees and commissions in the several States under the act of June 17, 1902 (32 Stat. L., 388).

State.	Fiscal years.		Total for 11 years ended June 30, 1911.
	1901 to 1910	1911	
Arizona.....	\$704,933.34	\$140,503.30	\$861,436.64
California.....	4,194,440.30	334,503.37	4,528,943.67
Colorado.....	5,144,463.12	557,930.22	5,702,393.34
Idaho.....	4,145,576.30	324,375.90	4,469,952.20
Kansas.....	754,665.77	91,069.57	845,735.34
Montana.....	5,598,675.58	1,061,514.35	6,660,189.93
Nebraska.....	1,215,391.07	175,742.04	1,391,133.11
Nevada.....	335,586.63	79,935.89	415,522.52
New Mexico.....	2,938,126.39	408,168.15	3,346,294.54
North Dakota.....	10,463,635.17	709,158.58	11,172,793.75
Oklahoma.....	5,520,804.87	137,984.76	5,658,789.63
Oregon.....	9,412,067.39	324,907.03	9,736,974.42
South Dakota.....	4,484,276.43	1,071,777.91	5,556,054.34
Utah.....	1,367,281.22	108,420.20	1,475,701.42
Washington.....	5,848,303.13	280,769.77	6,109,072.90
Wyoming.....	3,228,878.01	342,186.82	3,571,064.83
Total.....	65,357,104.72	6,135,547.76	71,492,652.48

Amount of collections from reclamation water-right charges, etc., during the fiscal years ended June 30, 1908, 1909, 1910, 1911, and 1912.

[No water-right charges collected prior to July 1, 1907.]

States and land offices.	1908	1909	1910	1911	1912
California:					
Los Angeles.....			\$42,269.51	\$10,602.48	\$56,257.52
Redding.....					300.00
Idaho:					
Hailey.....	\$5,706.18	\$7,703.66	184,332.69	180,470.71	106,619.86
Montana:					
Billings.....	38,431.85	15,999.45	27,026.22	54,140.32	73,732.73
Glasgow.....			6,453.25	3,566.00	1,249.00
Great Falls.....	1,631.00	18,944.52	14,926.73	10,960.16	35,357.44
Miles City.....		199.50	8,626.00	4,326.25	4,213.32
Nebraska:					
Allamore.....		4,767.47	68,667.09	26,092.00	77,820.31
Nevada:					
Carson City.....	8,447.95	15,926.02	58,103.13	75,873.55	58,969.25
New Mexico:					
Roswell.....		7,626.75	72,483.60	70,949.35	25,917.20
North Dakota:					
Williston.....	423.00	556.50	4,397.47	5,552.18	3,897.60
Oregon:					
La Grande.....	350.00	6,114.60	61,011.44	73,658.17	55,714.04
Lakeview.....		7,150.48	66,112.00	115,107.00	84,028.20
South Dakota:					
Beledonruche.....			39,880.62	91,103.95	22,350.80
Rapid City.....			60.00		
Washington:					
North Yakima.....		11,316.82	50,457.47	103,047.28	242,109.56
Waterville.....		3,375.20	22,475.50	27,842.50	24,176.25
Wyoming:					
Cheyenne.....		14.00	3,829.80	571.40	1,754.00
Lander.....	8,412.53	52,827.70	39,465.83	38,550.99	75,064.63
Total.....	63,402.51	159,490.93	770,586.25	892,414.29	9,014,542.21
Total to June 30, 1912.....					2,800,426.33

Entries examined in General Land Office during fiscal year ended June 30, 1912.

Kinds of entries.	Pending June 30, 1911.	Re- ceived.	Total.	Ap- proved.	Can- celed.	Other- wise dis- posed of.	Total.	Pending June 30, 1912.
Homesteads:								
Original.....	364,519	60,169	424,679	402	6,351	59,775	66,528	358,151
Final.....	8,774	30,871	39,645	28,319	153	2,978	31,440	8,205
Commuted.....	4,088	28,264	27,352	22,332	40	547	22,919	4,433
Soldier's additional.....	1,431	495	1,926	589	446	115	1,160	776
Timber and stone.....	606	2,328	2,934	1,877	39	193	2,102	832
Desert land:								
Original.....	41,658	11,243	52,901		7,606	2,542	10,148	42,753
Final.....	3,292	2,544	5,836	2,219	42		2,261	3,575
Year proofs examined.....							20,833	
Assignments examined.....							1,245	
Extension of time exam- ined.....							2,647	
Mineral, final.....	1,441	873	2,314	1,109	62		1,171	1,143
Coal, final.....	390	59	449	98	5		103	346
Timber culture:								
Original.....	15		15		6	8	14	1
Final.....	135	8	143	6	4		10	133
Preemption, final.....	272	3	275	6			6	269
Indian allotments.....	3,927	1,428	5,355	2,174	8		2,177	3,178
Indian homesteads.....								
Town sites.....	2	11	13	12	1		13	
Town lots.....	195	297	492	266	7		273	219
Public sales (isolated tracts).....	1,255	4,942	7,197	4,932	16		4,948	2,249
Lieu selections (act June 4, 1897).....	830	311	1,141	221		59	280	861
Military-bounty land war- rants.....	766	263	1,029	161	17	93	271	758
Miscellaneous entries.....	5,333	290	5,623	290	4	2,876	3,140	2,453

State and Territorial grants fiscal year ended June 30, 1912.

Kind of selection.	Pending and received.			Disposed of.			Pending June 30, 1912.
	Pending July 1, 1911.	Since received.	Total.	Ap- proved.	Can- celed.	Total.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
School indemnity.....	1,835,415.75	231,740.52	2,067,156.27	147,988.16	42,091.03	190,079.19	1,877,077.08
University.....	24,788.34	2,837.39	27,625.73	11,484.56	10,230.86	21,715.36	5,910.37
Agricultural college.....	15,705.47		15,705.47	5,951.19	120.00	6,071.19	9,634.28
Improvement of the Rio Grande.....	320.00		320.00				320.00
Internal improvements.....	200.07	14,033.77	14,233.84		14,033.77	14,033.77	200.07
Two million acre grant.....		40.17	40.17				40.17
Public buildings.....	10,589.53		10,589.53	6,618.06	315.56	6,933.62	3,655.91
Insane asylums.....	1,199.18	160.00	1,359.18	79.75	120.00	199.75	1,159.43
Educational, charitable, pe. al. and reformatory.....	18,986.85	80.00	19,066.85		10,886.22	10,886.22	8,236.63
Deaf and dumb asylums.....	3,160.99	40.00	3,200.99	280.82		280.82	2,920.17
Reform schools.....	1,307.63	151.13	1,458.76	40.00		40.00	1,418.76
School of mines.....	1,856.65	120.00	1,976.65	200.00		200.00	1,776.65
Normal schools.....	2,119.88	19	2,130.05	1,479.89	160.00	1,639.89	480.16
Blind asylums.....	318.30		318.30	160.00		160.00	158.30
Reservoirs.....	8,323.74	200.00	8,523.74	4,724.62	472.45	5,197.07	3,326.67
Miners' hospital.....	474.35		474.35	74.35		74.35	400.00
Experimental forestry.....	40.00		40.00		40.00		
University preparatory school.....	40.00		40.00				40.00
Agricultural and mechan- ical college.....	2,278.44		2,278.44		40.00	40.00	2,238.44
Colored agricultural and normal university.....	4,939.28	40.00	4,979.28	2,196.22	80.00	2,276.22	2,703.06
Specific grant total.....	96,648.63	17,702.65	114,351.28	33,292.46	36,448.80	69,741.26	44,610.02
Grand total.....	1,932,064.38	249,443.17	2,181,507.55	181,280.62	78,539.83	259,820.45	1,921,687.10

State and Territorial grants—Recapitulation.

States or Territories.	Indemnity school land.			Other grants.		
	Pending and selected.	Confirmed.	Canceled.	Pending and selected.	Confirmed.	Canceled.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
California.....	445,734.14	1,760.00	1,834.59			
Colorado.....	39,943.20	4,320.00	1,443.31			
Florida.....	2,102.19	1,017.88	483.72			
Idaho.....	232,955.87	5,398.13	8,212.79	3,729.83	3,679.89	
Kansas.....				99.12		
Louisiana.....	1,363.30	301.16	320.12			
Mississippi.....	483.72		483.72	320.65		320.65
Montana.....	279,726.40		351.40	2,580.40		
Nevada.....				240.24		
New Mexico.....	465,444.24	80,968.90	3,559.82	2,921.14	1,041.14	
North Dakota.....	20,401.23			2,095.30	120.00	
Oklahoma.....	160.00			7,657.67	2,399.22	280.00
Oregon.....	49,478.26	40.00				
South Dakota.....	94,700.91					
Utah.....	235,274.80	54,182.09	14,208.28	52,966.75	24,169.58	10,698.16
Washington.....	40,761.14			283.35		
Wisconsin.....				14,073.77		14,073.77
Wyoming.....	158,626.87		11,193.28	27,373.06	1,882.63	11,076.22
Total.....	2,067,156.27	147,988.16	42,091.03	114,351.28	33,292.46	36,448.80

Swamp land grants.

LAND IN PLACE CLAIMS, ESTIMATED.

Pending and received:	<i>Acres.</i>
On hand July 1, 1911.....	420,067.93
Received.....	75,403.97
Total.....	495,501.90
Disposed of:	
Patented.....	26,932.15
Rejected and canceled.....	10,125.16
	37,057.31
Pending June 30, 1912.....	458,444.59

INDEMNITY, CASH AND LAND.

On hand July 1, 1911.....	1,500,244.62
Rejected and canceled.....	
Pending June 30, 1912.....	1,500,244.62

Withdrawals under the act of Mar. 15, 1910 (36 Stat., 237) during fiscal year ending June 30, 1912.

State.	Applied for.	Rejected or relinquished before withdrawal.	Withdrawn.	Restored.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Colorado.....	305,867.17	46,579.66	38,896.17	232,239.13
Idaho.....	47,525.85	21,682.07	35,213.23	185,677.88
Montana.....				32,976.29
Nevada.....	262,830.06	304,854.52	5,118.62	260,943.67
New Mexico.....	373,951.62	56.36	10,000.00	10,000.00
Oregon.....	429,854.93	203,325.90	48,686.61	156,533.72
Utah.....			21,065.74	167,611.03
Wyoming.....	6,444.39	16,690.77	55,229.25	18,591.17
Total.....	1,416,474.04	593,189.28	214,211.62	1,064,572.89

State desert-land segregations under section 4 of the act of Aug. 18, 1894 (28 Stat., 372-422), and the acts amendatory thereof, commonly known as the Carey Act, during fiscal year ended June 30, 1912.

State.	Applied for.	Segregated.	Rejected or relinquished.	Patented.	Reconveyed.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Colorado.....			8.82		
Idaho.....	15,348.58	15,236.71	356,359.96	74,911.06	
Montana.....	20,843.71	28,188.05	230,124.78	7,356.12	
Nevada.....	56,145.17		490.00		
New Mexico.....					
Oregon.....	80,457.41	43,033.64	1,990.00		
Utah.....	7,500.28				
Wyoming.....	4,402.24	11,458.61	65,879.80	3,328.52	2,784.43
Total.....	184,697.39	97,917.01	654,843.05	85,595.72	2,784.43

Lands certified or patented on account of railroad and wagon road grants during fiscal year ending June 30, 1912.

Railroads.	State.	Acres.
State grants:		
Florida Central & Peninsula.....	Florida.....	518.85
Vicksburg, Shreveport & Pacific.....	Louisiana.....	3,907.24
Total of State grant.....		4,426.09
Corporations:		
Northern Pacific.....	Minnesota.....	40.00
Do.....	Montana.....	1,675.20
Do.....	North Dakota.....	673.90
Do.....	Oregon.....	11,175.13
Do.....	Washington.....	863.26
Do.....	Wisconsin.....	40.00
Total of corporations.....		14,467.49
Wagon roads:		
California & Oregon Land Co. (successor to Oregon Central Military Road).	Oregon.....	6,500.29

RECAPITULATION.

	<i>Acres.</i>
State grants.....	4,426.09
Corporations.....	14,467.49
Wagon roads.....	6,500.29
Grand total.....	25,393.87
Received: Railroad selections.....	1,303,013.18

Alleged fraudulent entries acted on during year.

Kind of entry.	Pend- ing June 30, 1911.	Re- ceived.	Disposed of.				Pend- ing June 30, 1912.	Hearings or- dered by—	
			Ap- proved.	Can- celed.	Other- wise dis- posed of.	Total.		Gen- eral Land Office.	Forest Ser- vice.
Homestead:									
Originals.....	16,840	7,564	.	2,821	12,833	15,654	8,750	1,690	17
Finals.....	2,915	3,985	2,534	20	2,931	5,485	1,415	90	.....
Cash.....	61	2,805	1,999	14	547	2,560	366	41	.....
Desert land:									
Originals.....	1,060	1,632	.....	290	782	1,072	1,620	162	2
Finals.....	473	220	.....	12	573	585	102	29	.....
Timber culture:									
Originals.....	104	6	.....	4	.....	4	106	.....	.....
Finals.....	84	.....	.....	2	52	54	30	.....	.....
Timber and stone:									
Sworn statements.....	1,806	263	.....	145	1,578	1,723	346	51	1
Cash.....	19	798	343	16	193	552	266	20	.....
Isolated tract:									
Applications.....	.....	8	9	.....	.....	9	6	1	.....
Cash.....	.....	1	.....	.....	.....	.....	2	.....	.....
Mineral:									
Applications.....	960	1,076	.....	200	311	511	1,525	58	2
Finals.....	567	273	.....	.....	561	561	279	19	1
Soldiers' additional applica- tions.....	1,431	495	589	446	115	1,150	776	.....	.....
Selections:									
State.....	368	1,805	.....	6	1,090	1,086	1,087	27	1
Forest.....	991	264	.....	16	371	387	868	80	.....
Railroad.....	.....	7	.....	.....	6	6	8	.....	.....
Indian allotments.....	75	1,207	.....	.....	111	111	1,271	12	.....
Squatter claims.....	121	1	.....	12	78	90	32	6	2
Mineral locations.....	225	20	.....	.....	169	169	67	12	.....
Total.....	28,100	22,590	5,474	4,004	22,291	31,769	18,921	2,298	26

Field reports on alleged fraudulent entries.

Field:	
Forester—	
Adverse.....	171
Favorable.....	809
Agents—	
Adverse.....	10,036
Favorable.....	17,152

Indictments, convictions, acquittals and dismissals, fines imposed and paid, and prison sentences, June 30, 1911, to June 30, 1912.

Offenses.	Indictments.	Convictions.	Prison sentences.	Fines imposed.	Fines paid.	Acquittals and dismissals.
Timber trespass.....	37	19	1	\$1,027.00	\$977.00	27
Conspiracy.....	34	19	6	3,160.00	6,150.00	102
Perjury.....	19	4	3	1,200.00	100.00	44
Unlawful inclosures.....	11	11		1,550.00	3,968.00	5
Miscellaneous.....						
Subornation of perjury.....	8	3		500.00	750.00	11
Impersonating Government agent.....	1	5	5			
Intimidating homesteaders.....	15	8	8	710.00	600.00	17
Forgery.....	4	3	1	100.00		1
Filing false claims.....	11					2
Section 5438.....	1					
Tampering with Government witnesses.....	1					
Tampering with grand jury.....	3					
Disobedience to subpoena.....	1	1		25.00	25.00	4
Section 127, Penal Code.....	4	3	2			1
Collecting illegal fees.....	3	2		150.00	150.00	4
Using mails to defraud.....	6	5				3
Section 37, Penal Code.....	4					
Section 19, Penal Code.....	15					
Preventing bids at public sale.....	1					
Removing Government corner stone.....		1		50.00	25.00	
Defacing survey monument.....	1					
Section 59, Penal Code.....						2
Misuse of funds.....						2
Total.....	180	84	26	8,472.00	12,645.00	221

Class, number, and area of patents issued during fiscal year ended June 30, 1912.

Class.	Number.	Area.	Class.	Number.	Area.
Commuted homestead.....	22,507	3,338,686.700	Small holding claim.....	119	9,817.961
Timber and stone.....	1,918	221,573.130	Railroad.....	21	20,975.480
Public sale.....	4,925	445,086.181	Swamp.....	10	26,972.140
Desert land.....	913	364,728.100	Agricultural college scrip.....	4	321.700
Cash miscellaneous.....	2,285	90,585.080	Choctaw scrip.....	15	2,257.110
Town site.....	14	3,520.343	Sioux half-breed scrip.....	10	1,281.120
Town lot.....	331	317.720	Surveyor general's scrip.....	3	2,728.805
Homestead.....	28,442	5,011,948.130	Valentine scrip.....	4	117.970
Soldiers' additional homestead.....	563	31,306.039	Isaac Crow lieu.....	2	200.000
Forest homestead.....	190	21,614.138	Cherokee school lands.....	7	359.780
Indian homestead.....	3	100.000	Abandoned military reservation.....	145	10,154.980
Reclamation homestead.....	1	100.000	Umatilla Indian land.....	40	3,944.940
Military bounty land warrant.....	110	8,029.860	Cemetery site.....	13	524.590
Forest lieu selection.....	230	42,187.536	State desert land segregation.....	3	16,474.680
Timber culture.....	9	993.540	White Earth town lot.....	1	1.020
Indian.....	3,367	226,784.640	Special and miscellaneous acts.....	68	77,454.490
Mineral.....	1,039	55,930.296			
Coal.....	97	12,670.500			
Private land claim.....	36	85,631.356	Total.....	67,475	10,135,475.015

Cases approved and awaiting patent July 1, 1911.....	3,047
Cases received for patenting during the year.....	64,920
Total.....	67,967
Acres of Indian fee patents not included in the above.....	137,267.310

Sales of Indian lands during fiscal year ended June 30, 1912.

	Original entries.		Receipts, sales, and interest.
	Number.	Area.	
Alabama:			
Montgomery—Cherokee Indian school lands.....	42	4,389.60	\$5,487.22
Arizona:			
Phoenix—Colorado Indian Reservation.....			158.00
California:			
Eureka—Round Valley Indian.....	1	120.00	357.50
Los Angeles—Yuma.....			6,074.65
San Francisco—Round Valley.....	5	800.00	1,504.30
Colorado:			
Durango—			
Southern Ute (act Feb. 20, 1895).....	136	17,261.64	5,789.30
Ceded Ute (acts June 15, 1880, and July 28, 1882).....	67	10,239.55	1,651.57
Glenwood Springs—Ute (acts June 15, 1880, and July 28, 1882)...	289	38,629.56	24,618.97
Montrose—Ute (acts June 15, 1880, and July 28, 1882).....	465	62,989.81	39,597.08
Idaho:			
Blackfoot—Fort Hall, Pocatillo town lots.....			690.00
Coeur d'Alene—Coeur d'Alene (act June 21, 1906).....	213	25,716.40	150,471.14
Kansas:			
Dodge City—Osage trust and diminished reserve.....	7	714.29	1,105.07
Minnesota:			
Cass Lake—Chippewa.....	629	79,252.18	30,000.68
Crookston—			
Chippewa.....	1,276	182,660.12	19,416.77
Red Lake.....	271	32,379.97	129,394.99
Duluth—Chippewa.....	156	14,940.45	11,643.25
Montana:			
Billings—Crow Indian.....	11	948.66	222,905.63
Glasgow—Fort Peck town lots.....			1,285.00
Kalispell—Flathead.....	253	27,154.32	59,986.94
Missoula—			
Flathead.....	567	58,977.25	91,558.41
Bitter Root.....	1	80.00	388.50
North Dakota:			
Devils Lake—Sioux Indian.....	22	1,113.63	7,660.46
Minot—Fort Berthold.....	485	76,984.11	31,102.32
Oklahoma:			
Guthrie—			
Wichita.....	32	4,077.31	5,096.14
Cheyenne and Arapahoe.....	1	640.00	15,903.44
Kiowa, Comanche, and Apache.....			148,743.70
Lawton—Kiowa, Comanche, and Apache.....			184,695.28
Oregon:			
La Grande—Umatilla Indian.....			5,579.16
South Dakota:			
Chamberlain—			
Rosebud.....	675	107,088.13	49,742.45
Pine Ridge.....	57	9,139.62	3,269.02
Gregory—			
Rosebud.....	155	17,213.23	556,924.39
Sioux.....			400.00
Lemmon—Standing Rock.....	231	35,615.97	86,058.29
Pierre—Lower Brule.....	2	319.76	3,165.60
Timber Lake—			
Cheyenne River.....	369	56,974.42	159,143.38
Standing Rock.....	72	10,916.03	36,226.44
Utah:			
Vernal—Uintah Indian.....	185	35,209.85	103,429.49
Washington:			
Spokane—			
Colville Indians.....	146	15,812.00	8,120.69
Spokane Indians.....	21	1,896.25	7,338.21
Waterville—Colville Indians.....	138	13,193.21	3,378.65
Wyoming:			
Lander—Shoshone or Wind River Indian.....	16	2,027.91	14,466.29
	6,986	950,584.13	2,284,538.37

Entries made and expenses incurred at district land offices during fiscal year ended June 30, 1912.

Location.	Number of appli- cations, entries, etc. (original and final).	Area (acres).		Patented.	Fees and com- missions.	Receipts.		Total.	Expenses.		Total.
		Entered.				Sales of land.			Salaries and com- missions of regis- trars and receivers.	Incidental expenses.	
		Original.	Final.			Public.	Indian.				
Alabama:	1,472	86,225.44	35,442.24	41,807.600	\$10,378.31	\$13,730.20	\$5,487.22	\$29,595.73	\$5,402.62	\$1,334.70	\$7,827.32
Montgomery.....											
Railroad, Indian and private land grants.....											
Alaska:				5,993.200							
Fairbanks.....	8	40.54			40.00	107.50		147.50			644.44
Juneau.....	57	4,992.12		4,057.651	929.47	10,638.35		11,567.82	3,899.45	1,775.34	5,674.82
Nome.....	27	212.23		559.482	222.30	638.00		857.30	234.98	78.00	312.98
Arizona:											
Phoenix.....	2,903	669,292.97	51,953.89	136,354.116	29,402.51	108,666.01	158.00	138,286.52	6,000.00	6,907.29	12,907.29
Arkansas:											
Camden.....	916	44,728.60	40,149.15	58,286.970	6,849.90	10,401.23		17,251.13	4,732.88	1,576.25	6,309.13
Harrison.....	2,035	122,483.38	83,728.49	73,751.950	15,578.23	9,077.39		24,655.62	6,000.00	3,094.45	9,094.45
Little Rock.....	1,408	73,106.60	63,725.00	80,398.150	11,099.80	7,903.82		19,003.62	6,000.00	3,872.00	9,872.00
California:											
Eureka.....	336	25,441.04	5,480.75	16,379.645	3,066.83	28,295.51	357.50	31,089.84	3,482.12	85.00	3,567.12
Independence.....	534	147,675.48	2,843.59	12,314.435	3,629.92	60,755.43		64,385.35	4,275.34	387.30	4,662.64
Los Angeles.....	2,941	396,914.06	4,742.66	17,923.08	17,923.08	143,661.62	6,074.65	193,916.87	7,806.50	7,806.50	13,807.50
Redding.....	240	19,734.63	8,121.02	21,814.096	2,694.01	23,444.20	300.00	26,438.52	3,208.70	615.00	3,823.70
Sacramento.....	721	66,902.56	16,412.07	30,564.635	8,740.61	22,349.91		31,090.52	5,989.86	2,580.75	8,570.61
San Francisco.....	727	63,890.97	14,924.12	29,667.901	8,218.86	34,693.53	1,509.30	44,421.69	5,680.46	2,313.00	7,993.46
San Jose.....	558	84,363.18	13,655.16	18,970.555	4,351.44	26,118.69		30,470.13	3,722.80	1,270.05	4,992.85
Susana.....	686	66,489.76	20,146.05	18,165.210	6,422.23	47,744.72		54,165.95	6,000.00	1,845.96	7,845.96
Railroad, Indian, and private land claims.....				413.610							
Colorado:											
Del Norte.....	406	40,823.39	22,705.51	20,896.547	2,903.17	25,230.97		28,134.14	3,162.88	312.65	3,475.53
Denver.....	2,057	232,657.78	85,088.08	92,645.831	21,573.01	75,660.04		97,223.05	6,000.00	5,273.18	11,273.18
Durango.....	355	29,965.30	6,280.33	26,014.586	6,952.97	10,393.45	7,440.87	23,767.29	4,384.66	1,779.75	6,164.41
Glenwood Springs.....	669	46,492.01	18,819.59	49,230.876	8,081.18	14,101.15	24,618.97	46,801.30	6,000.00	3,203.38	9,203.38
Hugo.....	1,465	119,225.61	143,537.53	49,230.876	18,475.66	55,723.35		74,199.01	6,000.00	2,857.25	8,857.25
Lamar.....	1,310	202,752.81	46,281.04	48,842.866	16,635.30	28,738.99		45,419.29	6,000.00	3,336.76	9,336.76
Leadville.....	180	19,661.12	2,594.99	4,282.717	1,179.21	8,333.12		9,512.33	1,970.85	76.20	2,047.05
Montrose.....	188	57,541.26	80,747.92	6,657.45	4,333.29	39,597.08		50,567.80	5,815.96	3,147.50	8,963.46
Pueblo.....	2,032	200,340.00	87,566.97	60,302.912	66,794.08	69,794.08		89,764.26	6,000.00	3,754.26	9,754.26
Sterling.....	1,913	264,610.73	101,014.06	103,218.090	74,541.28	74,541.28		98,365.74	6,000.00	4,060.20	10,060.20

[illegible]

^a Has only 3 quarters of fiscal year; fourth quarter not reported when gone to press.

Entries made and expenses incurred at district land offices during fiscal year ended June 30, 1912—Continued.

Location.	Number of applications, entries, etc. (original and final).	Area (acres).		Receipts.			Total.	Expenses.		Total.	
		Entered.		Patented.	Sales of land.			Reclamation water right charges, reclamation town sites, etc.	Salaries and commissions of registrars and receivers.		Incidental expenses.
		Original.	Final.		Fees and commissions.	Public.						Indian.
Nebraska—Continued.											
Valentine.....	1,525	425,073.56	221,590.22	290,071,640	\$13,306.24	\$63,791.59	\$77,067.83	\$6,000.00	\$1,724.83	\$7,724.83	
Railroad, Indian, and private land grants.....				394,560							
Nevada:											
Carson City.....	989	261,188.07	14,141.04	19,128,396	9,924.52	58,211.49	122,085.26	6,000.00	3,093.05	9,083.05	
Railroad, Indian, and private land grants.....				260,000			\$53,959.25				
New Mexico:											
Clayton.....	1,528	243,066.65	48,761.87	50,245,860	20,260.95	28,710.59	48,971.54	6,000.00	4,676.15	10,676.15	
Fort Sumner.....	1,230	80,538.54	130,344.46	155,897,790	13,092.43	23,346.02	36,438.45	6,000.00	4,581.97	10,581.97	
Las Cruces.....	1,822	242,541.61	41,220.45	39,614,570	13,248.33	69,296.57	82,544.90	6,000.00	3,947.30	9,947.30	
Roswell.....	1,437	210,806.13	58,306.25	73,882,840	15,445.13	45,298.91	86,961.24	6,000.00	4,738.30	10,738.30	
Santa Fe.....	1,804	145,816.87	112,263.07	124,290,929	18,203.95	59,001.70	77,205.65	6,000.00	5,216.50	11,216.50	
Tucuman.....	1,456	127,629.99	120,345.71	103,470,430	16,831.12	19,626.04	36,457.16	6,000.00	4,327.29	10,327.29	
Railroad, Indian, and private land grants.....				56,428,310							
North Dakota:											
Bismarck.....	2,525	68,119.58	286,535.10	379,048,620	21,967.87	87,991.53	109,959.40	6,000.00	4,326.80	10,326.80	
Devils Lake.....	394	12,733.72	31,477.06	48,113,150	2,885.14	14,475.44	25,021.04	3,094.96	1,224.10	4,319.06	
Dickinson.....	3,003	107,147.51	340,809.06	464,091,360	24,676.76	203,416.34	228,093.10	6,000.00	6,223.64	12,223.64	
Fargo.....	326	7,620.38	35,412.32	52,526,560	2,647.36	14,647.07	17,294.43	3,409.14	10.00	3,419.14	
Minot.....	797	35,137.17	88,420.51	121,703,790	11,438.76	30,249.71	122,790.79	5,125.14	3,379.30	8,504.44	
Williston.....	2,215	75,312.11	249,295.31	317,060,750	12,628.53	164,232.44	180,778.57	6,000.00	5,111.00	11,111.00	
Railroad, Indian, and private land grants.....				557,900			3,897.60				
Ohio:				8,000							
Oklahoma:											
Guthrie.....	714	25,365.22	58,084.71	82,373,377	5,777.37	18,750.09	194,275.74	4,852.38	4,991.90	9,844.28	
Lawton.....	218	11,626.96	14,463.28	82,461,614	2,472.14	7,371.33	194,538.75	2,271.33	1,815.50	4,086.83	
Woodward.....	2,228	55,853.82	263,399.64	384,480,750	13,438.53	47,047.20	60,455.73	6,000.00	5,648.17	11,648.17	
Railroad, Indian, and private land grants.....				1,064,180							

Oregon:	902	111,201.60	24,097.75	40,530.220	29,200.50	.....	55,714.04	34,722.79	5,976.28	1,927.25	7,973.53
Burns.....	1,303	108,772.20	48,544.58	76,015.041	78,785.73	5,579.16	84,028.20	150,571.85	6,000.00	3,484.50	9,098.50
La Grande.....	1,119	146,175.89	28,963.09	17,754.520	71,554.73	.....	.....	155,990.53	6,000.00	1,983.30	7,983.30
Lakeview.....	604	46,830.35	10,636.41	18,252.249	15,197.68	.....	.....	21,146.25	4,288.45	1,933.40	6,331.86
Roseburg.....	1,066	87,254.81	33,800.09	69,252.676	10,941.68	.....	.....	82,910.73	6,000.00	4,022.80	10,022.80
The Dalles.....	1,568	162,696.09	64,224.35	85,255.680	14,683.84	.....	.....	85,222.97	6,000.00	4,030.45	10,030.45
Vale.....	511	54,428.26	17,456.31	15,244.943	4,186.84	.....	.....	22,631.06	3,522.38	1,540.23	5,062.61
Railroad, Indian, and private land grants.				12,379.800							
South Dakota:											
Blackmountain.....	2,304	53,130.10	254,255.43	281,551.216	9,683.61	22,350.80	.....	290,840.25	6,000.00	5,620.88	11,020.88
Chamberlain.....	792	74,414.71	81,741.29	103,762.110	14,987.87	83,011.47	.....	96,919.90	6,000.00	2,867.00	8,367.00
Gregory.....	53	2,904.11	3,723.58	171,840.960	9,551.09	557,324.39	.....	570,891.54	6,000.00	2,630.00	8,680.00
Lemmon.....	3,343	89,728.94	411,152.18	544,412.790	16,274.76	86,068.29	.....	386,887.35	6,000.00	6,126.73	11,126.73
Pierre.....	1,201	31,905.76	145,252.72	176,418.300	5,848.83	3,165.60	.....	86,886.17	6,000.00	9,721.50	9,721.50
Rapid City.....	3,574	174,728.99	342,204.18	479,942.963	16,185.36	283,128.80	.....	309,313.66	6,000.00	7,526.75	13,026.75
Timberlake.....	453	2,410.74	68,960.55	37,379.700	10,147.49	190,398.82	.....	211,044.11	6,982.68	2,445.40	8,428.08
Railroad, Indian, and private land grants.				194,299.870							
Utah:											
Salt Lake City.....	2,089	490,597.52	31,081.84	29,314.940	25,219.47	.....	.....	146,981.65	6,000.00	4,368.75	10,866.75
Vernal.....	71	34,106.24	1,739.76	71,488.742	3,746.75	103,429.49	.....	110,292.10	5,022.14	437.80	5,459.94
Railroad, Indian, and private land grants.				80.000							
Washington:											
North Yakima.....	441	39,398.22	26,851.18	29,125.142	4,313.42	242,109.56	.....	270,922.04	6,000.00	3,429.13	9,429.13
Olympia.....	50	7,936.40	1,755.26	3,110.140	515.44	3,376.82	.....	3,892.28	1,452.97	610.45	2,063.42
Seattle.....	246	38,454.13	8,169.02	13,608.383	3,260.58	28,651.09	.....	31,901.67	4,232.48	2,749.50	6,981.98
Spokane.....	779	60,766.04	44,703.71	83,738.644	11,826.94	15,458.90	.....	57,656.06	6,000.00	2,694.80	8,694.80
Vancouver.....	392	30,264.19	14,324.84	22,884.914	4,175.54	21,370.29	.....	25,545.53	6,000.00	2,146.55	6,294.71
Walla Walla.....	697	62,700.88	38,331.35	52,956.220	7,161.44	22,909.84	.....	30,071.28	6,000.00	2,118.50	8,118.50
Wells.....	1,357	107,144.25	76,766.27	106,583.388	12,812.84	42,013.05	.....	82,380.79	6,000.00	8,010.75	9,010.75
Railroad, Indian, and private land grants.				1,240.00		3,378.45	.....				
Wisconsin:											
Waupun.....	488	16,099.44	23,494.02	30,894.650	3,675.09	3,654.26	.....	7,329.35	3,358.04	1,405.90	4,823.94
Wyoming:											
Buffalo.....	634	56,816.35	25,957.05	39,963.080	5,130.52	28,686.82	.....	33,817.34	4,626.98	3,087.00	7,713.98
Cheyenne.....	998	150,499.62	31,085.60	44,275.121	12,174.83	51,885.76	.....	66,811.69	6,000.00	2,333.30	8,333.30
Douglas.....	805	86,634.62	25,925.81	32,209.403	6,644.54	41,990.22	.....	48,684.76	5,134.05	1,666.95	6,801.00
Evans.....	491	58,588.69	18,853.48	27,813.757	4,131.34	303,710.57	.....	307,841.91	6,000.00	1,102.50	7,102.50
Laundon.....	431	40,816.26	17,349.48	36,574.710	3,957.43	14,466.20	.....	114,582.21	5,435.48	1,096.75	7,132.23
Sundance.....	980	107,736.45	35,544.43	78,998.570	7,391.05	63,765.99	.....	71,187.04	6,000.00	2,644.45	8,644.45
Made at General Land Office.....				3,677.110		2,080.00	.....	2,080.00			
Total.....	120,009	13,624,104.69	7,163,372.85	10,125,475.015	1,234,216.47	5,457,502.07	914,542.31	9,870,799.22	533,507.75	316,613.26	850,121.04

Entries made and expenses incurred at district land offices during fiscal year ended June 30, 1912—Continued.

RECAPITULATION BY STATES.

Location.	Number of applications, entries, etc. (original and final).	Area (acres).			Receipts.				Total.	Expenses.		Total.
		Entered.		Patented.	Fees and commissions.	Sales of land.		Reclamation water right charges, reclamation town sites, etc.		Salaries and commissions of registrars and receivers.	Incidental expenses.	
		Original.	Final.			Public.	Indian.					
Alabama.....	1,472	86,226.44	35,442.24	47,900,900	\$10,378.31	\$18,730.20	\$5,487.22	.....	\$29,596.73	\$5,492.62	\$1,324.70	\$6,817.32
Alaska.....	2,92	5,244.95	.....	4,617,133	1,191.77	11,380.85	.....	.....	12,572.62	4,134.64	2,497.78	6,632.42
Arizona.....	2,908	699,262.07	51,953.59	136,344,116	20,492.51	108,692.51	158.00	.....	138,296.52	6,000.00	6,907.29	12,907.29
Arkansas.....	4,359	247,318.58	187,602.64	212,437,070	33,537.93	27,382.44	.....	.....	60,910.37	16,732.88	5,642.70	22,375.58
California.....	6,738	871,318.58	145,725.42	55,046,981	55,046.98	357,083.61	7,941.45	\$26,557.53	476,579.56	38,389.56	16,904.26	55,293.81
Colorado.....	10,466	1,225,105.46	518,425.46	603,606,996	128,211.90	363,083.62	71,666.92	.....	563,754.64	51,334.35	27,103.48	70,138.46
Florida.....	2,463	188,061.64	86,080.90	115,744,100	20,138.46	89,683.62	.....	.....	109,821.98	6,000.00	5,103.60	11,103.60
Idaho.....	7,265	835,123.85	262,699.24	323,527,918	77,683.28	243,164.09	151,161.14	106,619.86	578,628.37	29,947.92	24,968.20	54,916.12
Illinois.....	.....	.....	.....	1,143,800	.....	.....	.....	.....	.....	.....	.....	.....
Indiana.....	.....	.....	.....	840,000	.....	.....	.....	.....	.....	.....	.....	.....
Iowa.....	2,029	71,199.40	284,185.42	268,240,060	15,631.84	69,291.43	.....	.....	86,028.24	10,014.10	4,091.26	14,105.35
Kansas.....	500	16,491.13	22,945.90	35,013,420	4,370.04	10,301.70	1,108.07	.....	14,072.88	4,136.04	3,363.81	7,504.85
Louisiana.....	324	17,222.67	10,671.78	16,118,740	3,252.92	7,839.14	.....	.....	11,671.06	3,229.69	1,607.48	4,837.14
Michigan.....	1,799	87,016.74	63,230.83	265,518,710	46,212.22	62,255.68	190,465.69	.....	288,920.92	17,656.10	10,084.26	27,740.36
Minnesota.....	746	27,708.14	26,983.23	26,983,310	2,731.46	6,069.08	.....	.....	11,376.92	8,832.82	2,618.90	6,451.42
Mississippi.....	593	21,938.55	26,439.35	56,781,445	2,731.46	16,198.08	.....	.....	18,916.56	3,305.22	1,664.15	4,971.47
Missouri.....	20,628	3,600,260.67	626,835.97	742,220,379	260,663.24	865,170.61	376,124.46	114,553.09	1,626,987.91	58,098.00	41,351.41	99,449.41
Montana.....	5,924	1,364,388.67	1,046,683.16	1,367,171,160	53,413.16	177,735.44	.....	.....	308,967.91	29,301.24	11,108.41	40,409.65
Nebraska.....	8,989	261,188.07	14,141.61	19,368,396	9,994.83	58,211.49	.....	.....	6,000.00	3,093.08	9,093.08	10,000.00
Nevada.....	9,277	1,050,869.79	511,241.81	613,880,729	97,081.91	245,679.98	.....	.....	36,000.00	27,487.51	20,277.64	63,487.61
New Mexico.....	9,261	306,130.47	1,031,948.36	1,413,163,180	76,244.42	515,082.63	88,762.78	2,897.60	683,957.35	29,629.24	20,277.64	50,906.88
North Dakota.....	.....	.....	.....	81,000	.....	.....	.....	.....	.....	.....	.....	.....
Ohio.....	3,160	92,846.00	336,577.63	589,370,921	21,688.04	73,168.62	354,443.56	.....	449,300.22	13,123.71	12,455.57	25,579.28
Oklahoma.....	6,892	715,869.45	210,755.55	367,370,129	64,338.23	355,698.46	6,379.16	139,742.24	665,266.18	37,787.12	19,053.98	56,841.08
Oregon.....	11,719	499,281.04	1,291,920.64	1,990,247,909	51,638.00	895,123.61	894,929.57	27,340.80	41,982.68	29,448.26	71,430.94	71,430.94
South Dakota.....	2,130	514,673.70	32,920.60	1,000,863,682	28,986.26	129,878.03	103,929.49	.....	237,273.75	11,022.14	8,904.15	15,926.09
Texas.....	3,982	346,664.11	210,851.63	316,265,841	44,046.26	175,193.27	15,337.55	266,265.81	502,369.93	33,523.61	16,669.48	50,536.09
Washington.....	2,468	16,099.44	29,494.02	30,864,660	3,675.09	3,465.26	.....	.....	7,329.35	3,368.04	1,465.00	4,833.94
Wisconsin.....	.....	.....	.....	269,824,591	39,429.71	611,140.22	14,466.29	76,586.63	641,874.86	33,196.51	12,630.86	45,827.37
Wyoming.....	4,339	601,062.19	154,715.86	269,824,591	.....	2,090.00	.....	.....	2,090.00	.....	.....	.....
Office at General Land Office.....	.....	.....	.....	3,677,110	.....	2,090.00	.....	.....	.....	.....	.....	.....
Total.....	120,600	12,624,104.69	7,163,372.85	10,136,475,015	1,234,216.47	5,437,602.07	2,284,638.37	914,542.31	9,870,799.22	533,507.75	316,613.29	850,121.04

Entries made and expenses incurred at district land offices during fiscal year ended June 30, 1912—Continued.
 RECAPITULATION BY CLASSES OF ENTRIES—Continued.

States or Territories.	Coal land applications to purchase, act Mar. 3, 1873, and subsequent acts, for the fiscal year ended June 30, 1912.									
	Final certificates issued.					Final certificates not issued.				
	Number.	Acres.	Amount.	Number.	Acres.	Amount.	Number.	Acres.	Amount.	Total.
Colorado.....	2	81.45	\$4,481.70	1	83.62	\$836.20	3	165.07	\$5,317.90	
Idaho.....	2	1,159.66	11,600.00				2	1,159.66	11,600.00	
Montana.....	8	1,028.37	12,767.40				8	1,028.37	12,767.40	
Nevada.....	1	40.00	400.00				1	40.00	400.00	
New Mexico.....	6	800.00	16,000.00				7	920.00	18,400.00	
Oregon.....				6	120.00	2,400.00	1	840.00	8,400.00	
South Dakota.....	1	40.00	400.00				1	40.00	400.00	
Utah.....	18	2,520.00	66,980.00				18	2,520.00	66,980.00	
Washington.....	3	462.24	9,244.80				3	462.24	9,244.80	
Wyoming.....	17	1,694.48	296,379.08	2	193.52	1,878.40	19	1,878.00	298,257.48	
Total.....	58	7,816.20	417,252.98	10	1,237.14	13,514.90	68	9,053.34	430,767.88	

States or Territories.	Sale of abandoned military reservations.					Excess payments on homestead and other entries.					Desert land entries.				
	Entries.		Area (acres).		Amount.	Entries.		Area (acres).		Amount.	Entries.		Area (acres).		Amount.
	Original.	Final.	Original.	Final.		Original.	Final.	Original.	Final.		Original.	Final.	Original.	Final.	
Alabama.....						151		176.72		\$220.87					
Alaska.....															
Arizona.....	11		1,306.46		\$1,157.75			325.28		416.43	755		148,428.71	4,590.57	\$4,590.57
Arkansas.....						86		388.75		473.51					
California.....						217		846.23		1,290.97					
Colorado.....						461		2,003.78		2,184.82	2,110		424,877.14	52,652.31	52,650.06
Florida.....						100		393.54		491.91	1,137		191,177.21	56,196.93	56,197.37
Idaho.....						242		955.07		1,274.93					
Kansas.....						12		37.97		54.78	295		143,354.56	40,594.68	40,383.56
Louisiana.....						25		93.62		161.64					
Michigan.....						2		2.29		2.86					
Minnesota.....						26		96.52		145.82					
Mississippi.....						46		112.10		134.64					
Missouri.....						2		17.32		21.65					
Montana.....	1		800.00		706.59	715		2,416.06		3,743.22	1,890		296,004.51	122,449.66	124,455.71
Nebraska.....	1		160.00		1,653.87	276		1,349.66		1,703.40					

Nevada.....	3	380.00	300.00	300.00	37	113.87	308.41	283	45	50,992.81	8,381.94	12,874.75	8,388.29
New Mexico.....					800	918.90	1,181.07	648	95	189,289.46	15,032.10	42,310.18	15,032.10
North Dakota.....					106	506.99	1,011.72	2	2	189,468.33	15,480.00	42,310.18	15,480.00
Oklahoma.....					9	20.77	25.96						
Oregon.....					282	1,445.74	2,188.89	519	118	80,666.30	15,717.04	20,104.82	15,705.97
South Dakota.....					96	432.34	531.50	236	75	26,575.24	11,807.31	6,644.08	11,807.31
Utah.....					121	296.76	438.04	386	154	54,086.09	21,847.00	14,000.74	21,847.00
Washington.....	1	209.91	70.08		73	335.56	532.96	184	48	82,412.67	5,004.81	20,486.57	5,004.81
Wisconsin.....					7	33.06	50.07						
Wyoming.....					163	874.87	1,184.62	492	269	72,370.76	40,196.19	18,100.21	40,196.19
Total.....	13	2,796.37	4,767.87		8,616	14,211.78	19,611.78	10,392	2,454	1,742,375.84	394,870.44	435,208.21	394,870.44

Homestead entries.

States or Territories.	Entries.			Area (acres).			Amount.		
	Original.	Final.	Commuted.	Original.	Final.	Commuted.	Original.	Final.	Commuted.
Alabama.....	885	331	77	84,231.24	29,276.61	6,510.32	\$8,350.88	\$732.78	\$6,896.83
Alaska.....	14			1,185.32	23,882.61	23,155.45	26,285.50	945.61	29,542.06
Arizona.....	1,463	1,490	155	512,283.62	175,497.70	15,646.16	22,699.22	4,381.67	14,564.25
Arkansas.....	2,622	1,415	139	235,837.36	58,472.22	33,762.16	38,948.11	2,673.83	46,713.36
California.....	2,562	1,944	236	369,837.37	826,346.13	133,876.62	103,864.76	16,356.28	183,126.72
Colorado.....	4,908	1,857	869	1,002,971.49	43,831.06	41,663.97	16,241.73	1,083.60	62,005.96
Florida.....	1,455	1,028	323	172,538.11	148,856.47	72,298.02	56,994.61	6,442.07	62,337.88
Idaho.....	3,790	1,216	530	676,642.76	189,377.41	44,700.04	6,164.85	6,320.71	60,519.72
Kansas.....	432	225	292	66,183.11	17,380.66	6,431.72	1,972.79	514.70	7,251.45
Louisiana.....	235	76	76	15,086.23	8,444.66	9,026.24	38,564.69	252.77	2,781.16
Michigan.....	152	76	26	15,292.37	56,035.17	9,224.93	3,065.63	1,587.07	12,005.19
Minnesota.....	763	490	98	75,227.33	22,196.83	4,644.31	3,065.63	1,587.07	6,954.39
Mississippi.....	359	283	76	27,708.14	26,422.03	12,878.78	990.94	8,708.23	16,778.43
Missouri.....	120	1,164	163	9,379.82	179,507.59	8,517.60	246,027.44	8,068.39	473,380.19
Montana.....	12,697	2,187	2,143	1,283,651.33	1,030,536.10	8,517.60	36,768.83	8,182.24	11,422.60
Nebraska.....	376	70	70	208,407.50	3,346.00	2,389.23	3,346.00	14,766.76	3,296.04
Nevada.....	28	23	16	865,964.54	886,364.35	108,006.46	74,458.03	34,781.68	186,267.07
New Mexico.....	4,639	2,329	2,268	301,113.44	708,905.41	822,183.96	29,637.38	7,069.78	504,196.06
North Dakota.....	2,221	4,568	2,447	91,746.37	279,339.73	57,217.14	8,082.11	4,564.30	107,850.34
Oklahoma.....	807	1,872	6,573	564,854.82	111,436.50	82,156.37	50,273.61	5,407.21	788,406.91
Oregon.....	3,296	1,374	6,824	371,950.31	214,456.51	1,065,224.78	36,799.09	9,339.26	4,070.96
South Dakota.....	2,023	1,068	24	451,659.91	7,054.48	3,277.50	23,676.66	2,900.01	75,893.97
Utah.....	1,174	1,068	335	243,892.63	160,338.61	45,252.65	21,827.13	9,896.68	2,972.51
Washington.....	1,422		22	15,974.16	21,635.26	36,016.15	1,996.56	3,225.65	50,513.52
Wisconsin.....	213	467	233	367,610.44	77,229.64		30,347.34		
Wyoming.....	1,885								
Total.....	52,991	24,326	16,738	11,246,286.89	4,306,063.52	2,461,871.86	865,833.02	140,746.70	2,759,032.96

Entries made and expenses incurred at district land offices during fiscal year ended June 30, 1912—Continued.

RECAPITULATION BY CLASSES OF ENTRIES—Continued.

States or Territories.	Applications.						Mineral protests.		Filings.						Fees.		Miscellaneous entries, applications, sales, etc.				
	Timber and stone lands.		Coal lands.		Mineral lands.				Presumption.		Homestead.		Coal lands.		Reservoir.					Cancellation.	Received for reducing test-ling money to writing, etc.
	No.	Fees.	No.	Fees.	No.	Fees.	No.	Fees.	No.	Fees.	No.	Fees.	No.	Fees.							
Alabama.....	41	\$405	3	\$30	42	\$420	3	\$30									\$3	\$386.65	4	491.59	\$301.00
Alaska.....																			2	2.85	17.13
Arizona.....	1	10			99	990	3	30											2	130.21	131.00
Arkansas.....	47	470	16		5	50			7	\$21			10	\$27					6	502.50	652.50
California.....	244	2,440	5		118	1,180	7	70	17	51			5	50					6	86.24	131.80
Colorado.....	85	850	134		134	1,340	12	120	231	\$381			21	\$63	4	12			5	3,358.37	4,198.02
Florida.....	78	780	58		58	580	29	290	58	58			6	6					5	301.06	450.14
Idaho.....	78	780	12		60	600	1	10	12	6			6	18					1	1,076.04	19,138.71
Kansas.....									6	6									3	144.60	130.75
Louisiana.....	15	150			2	20													3	40.00	50.00
Michigan.....	39	390																	3	458.07	598.84
Minnesota.....	237	2,370							3	6									1	160.00	200.00
Mississippi.....	2	20																			
Missouri.....	163	1,630	136		1,360	11	110	11	33	67	201	72	216	31	93				2	160.35	202.00
Montana.....																					
Nebraska.....																					
Nevada.....	1	10	122		1,220	5	50	50	14	28											
New Mexico.....			44		440	6	60	60													
North Dakota.....	2	20							17	51	4	2	4	2	48				4	128.23	487.29
Oklahoma.....																			1	40.00	132.40
Oregon.....	403	4,030	18		180				1	3	130	260	5	15					5	324.51	690.07
South Dakota.....	27	270	13		130						188	376	8	16	6	12			1	40.00	50.00
Texas.....	7	70	58		580	7	70	70	13	39	87	81	6						2	222.95	133.10
Utah.....	162	1,620	20		200	3	30	30	4	12	17	51	61						2	302.40	8.00
Washington.....	11	110																	4	240.00	300.00
Wisconsin.....	88	880																	2		
Wyoming.....																			56	3,117.92	4,599.80
Total.....	1,730	17,265	3	30	879	8,790	60	600	139	417	617	1,694	215	635	74	211	5,059	106,013.49	122	11,364.88	33,922.55

There is included \$16,942.66 from sale of Shoshone and Bannock Indian lands, set June 6, 1910.

REPORT OF THE COMMISSIONER OF PENSIONS.

64213°—INT 1912—VOL 1—12

177

COMMISSIONERS OF PENSIONS SINCE 1833.

Name.	By whom appointed.	Whence appointed.	Date of commission.
Edwards, James L.....	Jackson.....	Virginia.....	Mar. 3, 1833
Heath, James E.....	Fillmore.....	do.....	Nov. 27, 1850
Waldo, Loren P.....	Pierce.....	Connecticut.....	Mar. 17, 1853
Minot, Josiah.....	do.....	New Hampshire.....	Aug. 1, 1855
Whiting, George C.....	do.....	Virginia.....	Jan. 19, 1857
Barrett, Joseph H.....	Lincoln.....	Ohio.....	Apr. 15, 1861
Cox, Christopher C.....	Johnson.....	Maryland.....	July 23, 1868
Van Aernam, Henry.....	Grant.....	New York.....	May 1, 1869
Baker, James H.....	do.....	Minnesota.....	Apr. 20, 1871
Atkinson, Henry M.....	do.....	Nebraska.....	Mar. 28, 1875
Gill, Charles R.....	do.....	Wisconsin.....	Feb. 10, 1876
Bentley, John A.....	do.....	do.....	Mar. 28, 1876
Dudley, William W.....	Garfield.....	Indiana.....	June 27, 1881
Clarke, Otis P. G.....	Arthur.....	Rhode Island.....	Nov. 15, 1884
Black, John C.....	Cleveland.....	Illinois.....	Mar. 19, 1885
Tanner, James.....	Harrison.....	New York.....	Mar. 27, 1889
Raum, Green B.....	do.....	Illinois.....	Oct. 19, 1889
Lochren, William.....	Cleveland.....	Minnesota.....	Apr. 13, 1893
Murphy, Dominic I.....	do.....	Pennsylvania.....	May 28, 1896
Evans, Henry Clay.....	McKinley.....	Tennessee.....	Apr. 1, 1897
Ware, Eugene F.....	Roosevelt.....	Kansas.....	May 10, 1902
Warner, Vespasian.....	do.....	Illinois.....	Mar. 4, 1906
Davenport, James L.....	Taft.....	New Hampshire.....	Nov. 28, 1909

REPORT OF THE COMMISSIONER OF PENSIONS.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PENSIONS,
Washington, D. C., August 31, 1912.

SIR: I have the honor to submit the following report, showing the operations of the Bureau of Pensions for the fiscal year ended June 30, 1912.

GENERAL STATEMENT.

In Exhibit 1 will be found the gains and losses to the roll by classes and the amount disbursed to each class of pensioners during the year. The number of pensioners on the roll June 30, 1911, was 892,098, and the number June 30, 1912, was 860,294, a net loss of 31,804, as shown in the following table:

Gains and losses in pension roll during the fiscal year 1912.

Losses to the roll:

By death.....	52, 863
By remarriage.....	799
By minors attaining the age of 16 years.....	929
By failure to claim pension for 3 years.....	295
From all other causes.....	229

Total..... 55, 115

Gains to the roll:

By original allowance.....	22, 712
By restoration and renewal allowances.....	599

Total..... 23, 311

Net loss to the roll..... 31, 804

The number of survivors of the Civil War on the pension roll at the close of the fiscal year was 497,263, a net loss to the roll of 32,621. The number of survivors whose names were dropped from the roll during the year on account of death was 33,891. The number of new names added to the roll was 1,513.

The number of individuals in the military and naval service of the United States during the Civil War is estimated at 2,213,365. As the number of survivors on the pension roll is less than 500,000, it is evident that 75 per cent or more of those who rendered service in the Civil War are deceased. The annual death rate of the survivors is nearly 7 per cent, and the average age is approximately 71 years.

The following summary shows the number of pensioners on the roll at the close of the fiscal years 1912 and 1911, together with the net gain or loss in each class during the year.

Pensioners on the roll June 30, 1912, and June 30, 1911.

	1912	1911	Gain.	Loss.
War of 1812:				
Widows.....	238	279	.....	41
Indian wars:				
Survivors.....	1,210	1,387	.....	177
Widows.....	2,439	2,629	.....	190
War with Mexico:				
Survivors.....	1,313	1,639	.....	326
Widows.....	5,533	5,982	.....	449
Civil War:				
Act of May 11, 1912—				
Survivors.....	13,246	.....	13,246	.....
Act of Feb. 6, 1907—				
Survivors.....	333,579	356,830	.....	23,251
General law—				
Invalids.....	103,237	113,063	.....	9,826
Widows.....	64,135	67,509	.....	3,374
Minor children.....	351	385	.....	34
Mothers.....	1,413	1,877	.....	464
Fathers.....	202	278	.....	76
Brothers, sisters, sons, and daughters.....	331	353	.....	22
Helpless children.....	515	508	7	.....
Act of June 27, 1890—				
Invalids.....	47,201	59,991	.....	12,790
Minor children.....	4,063	3,983	80	.....
Helpless children.....	416	375	41	.....
Act of April 19, 1908—				
Widows.....	232,947	228,198	4,749	.....
Army nurses.....	362	406	.....	44
War with Spain:				
Invalids.....	23,841	23,383	458	.....
Widows.....	1,238	1,217	21	.....
Minor children.....	304	326	.....	22
Mothers.....	2,951	3,032	.....	81
Fathers.....	508	522	.....	14
Brothers, sisters, sons, and daughters.....	6	9	.....	3
Helpless children.....	2	1	1	.....
Regular establishment:				
Invalids.....	14,373	13,787	616	.....
Widows.....	2,869	2,799	70	.....
Minor children.....	171	149	22	.....
Mothers.....	1,129	1,066	63	.....
Fathers.....	159	152	7	.....
Brothers, sisters, sons, and daughters.....	4	8	.....	4
Helpless children.....	8	5	3	.....
Total.....	860,294	892,098	19,384	51,188
Net loss.....				31,804

The number of soldiers and sailors on the pension roll at the close of the year was 538,000, the number of dependents and widows was 321,932, and the number of Army nurses was 362.

In Exhibit 2 will be found the number and amount of first payments made under each class of new certificates issued during the year. The total amount of first payments made during the year was \$4,096,502.81 on 78,781 new certificates. The number of certificates issued during the year remaining unpaid at the close of the year was 13,330, upon which there was due \$514,631.36. The appropriation for the payment of pensions became exhausted before the close of the year and the payments due on these cases could not be made until the new appropriation for the fiscal year 1913 became available on July 1, 1912. The bill making appropriation for the payment of pensions for the fiscal year 1913 was amended in the Senate, after the act of May 11, 1912, became a law, providing that \$500,000 of the appropriation should become immediately available. This provision was made in order that there would be sufficient funds to meet the increased pay-

ments due on the certificates issued under the act of May 11, 1912, before the close of the fiscal year. However, this bill failed to become a law before the close of the fiscal year and the \$500,000 which was to be provided therein did not become available and the amount due as first payments on a large number of certificates could not be paid until the enactment of the joint resolution of July 1, 1912, extending the appropriation of the previous year for the month of July.

The amount paid as attorneys' fees upon claims allowed by the bureau during the fiscal year 1912 was \$138,837.72.

The following table shows the first payments made on new certificates each year during the last five years:

First payments made during the last five years.

Fiscal year.	Number.	Amount.	Average.
1912.....	78,781	\$4,096,502	\$52.00
1911.....	83,632	4,842,925	51.72
1910.....	91,448	4,858,504	52.13
1909.....	124,634	6,459,416	52.07
1908.....	310,500	13,394,633	42.33

Average first payments in each class.

Average value of first payments:

In original cases.....	\$89.64
In original regular establishment cases.....	120.19
In original act Feb. 6, 1907, cases.....	93.28
In original general law, Civil War cases.....	177.44
In original act June 27, 1890, cases.....	267.08
In original act Apr. 19, 1908, cases.....	53.15
In original War with Spain cases.....	332.66
In increase and reissue cases.....	34.40
In original War with Mexico cases.....	164.52
In original Indian war cases.....	285.59

In Exhibit 3 is shown the appropriations and disbursements for the fiscal year 1912 and the unexpended balances at the close of the year, a summary of which is as follows:

Appropriations and disbursements for fiscal year ended June 30, 1912.

Appropriation for pensions.....	\$153,000,000.00
Repayments to the appropriation.....	4,727.89
Total amount available for pensions.....	153,004,727.89
Amount disbursed.....	152,986,433.72
Unexpended balance.....	18,294.17
Appropriation for medical examinations.....	200,000.00
Repayments to the appropriation.....	15.00
Total amount available.....	200,015.00
Amount expended and authorized.....	170,782.00
Unexpended balance.....	29,233.00

Appropriation for salaries and clerk hire, pension agencies.....	\$457, 003. 00
Amount disbursed.....	448, 653. 78
Unexpended balance.....	8, 349. 22
Appropriation for rent and contingent expenses of agencies.....	29, 501. 39
Amount expended and outstanding obligations.....	27, 250. 00
Unexpended balance.....	2, 251. 39
Appropriation for salaries, Bureau of Pensions.....	1, 483, 620. 00
Disbursed for salaries, Bureau of Pensions.....	1, 461, 913. 42
Unexpended balance.....	21, 706. 58
Appropriation for salaries, per diem and expenses, special examiners.....	273, 500. 00
Amount expended.....	271, 000. 67
Unexpended balance.....	2, 499. 33

Summary of unexpended balances, exclusive of pensions, covered into the treasury at the close of the fiscal year 1912.

Salaries in bureau.....	\$21, 706. 58
Salaries, per diem, and expenses, special examiners.....	2, 499. 33
Fees, examining surgeons.....	29, 233. 00
Salaries and clerk hire, pension agencies.....	8, 349. 22
Contingent expenses of agencies.....	2, 251. 39
Total.....	64, 039. 52

In Exhibit 4 is shown the amount disbursed for pensions, salaries, clerk hire, and contingent expenses at each of the pension agencies. It also shows the amount disbursed by the pension agency in New York, N. Y., for rent, and that disbursed by the pension agency in Washington, D. C., for fees of examining surgeons. There are more than 4,000 examining surgeons, and all are paid through the agency in this city.

The amount disbursed for fees of examining surgeons for the fiscal year 1912 was \$128,206.17. This does not include the amount required for fees during the last quarter of the fiscal year, as the accounts were not received by the bureau until after the close of the fiscal year. It is estimated that the cost of medical examinations during the fiscal year 1912, after all the accounts have been settled, will be \$170,782.

The amount expended for Navy pensions was \$5,319,822.08, a decrease of \$72,663.23 as compared with the previous year.

The law provides that Navy pensions shall be paid from the income of the Navy-pension fund, so far as the same shall be sufficient for that purpose. The income from the Navy-pension fund covers but a small fraction of the amount required each year for the payment of Navy pensions, as is shown in the following statement for the last five years.

Interest on Navy-pension fund and the amount paid for Navy pensions each year for the past five years.

Fiscal year.	Interest.	Navy pen- sions.	Fiscal year.	Interest.	Navy pen- sions.
1912.....	\$367,009	\$5,219,822	1909.....	\$371,345	\$5,337,014
1911.....	373,159	5,322,485	1908.....	390,409	4,494,350
1910.....	362,299	5,335,457			

The amount disbursed for pensions from July 1, 1790, to June 30, 1865, was \$96,445,444.23. The amounts disbursed each year since that date, the cost of administration, including the entire expenses of the bureau in the settlement of claims, the cost of the pension-agency service and fees, and expenses of examining surgeons, and the number of pensioners on the roll at the close of each fiscal year are shown in the following table:

Disbursements for pensions and maintenance of pension system, 1866 to 1912.

Fiscal year.	Paid as pensions.	Cost, mainte- nance, and ex- penses.	Total.	Number of pen- sioners.
1866.....	\$15,460,549.88	\$407,165.00	\$15,857,714.88	126,722
1867.....	20,784,789.69	490,977.35	21,275,767.04	155,474
1868.....	23,101,509.36	553,020.34	23,654,529.70	169,543
1869.....	28,513,247.27	564,526.81	29,077,774.08	187,963
1870.....	29,351,488.78	600,997.86	29,952,486.64	198,696
1871.....	28,518,792.62	863,079.00	29,381,871.62	207,496
1872.....	29,752,746.81	951,253.00	30,703,999.81	232,229
1873.....	26,982,063.89	1,003,200.64	27,985,264.53	238,411
1874.....	30,206,778.99	966,794.13	31,173,573.12	236,241
1875.....	29,270,404.76	962,666.35	30,233,071.11	234,821
1876.....	27,936,299.53	1,015,078.81	28,951,378.34	232,137
1877.....	28,182,821.72	1,034,459.33	29,217,281.05	232,104
1878.....	26,786,009.44	1,032,500.09	27,818,509.53	223,998
1879.....	33,664,428.92	837,734.14	34,502,163.06	242,758
1880.....	56,690,229.06	935,027.28	57,624,256.36	250,802
1881.....	50,583,406.35	1,072,059.64	51,655,466.99	268,830
1882.....	54,313,172.05	1,466,236.01	55,779,408.06	285,697
1883.....	60,427,573.81	2,591,648.29	63,019,222.10	303,658
1884.....	57,912,387.47	2,835,181.00	60,747,568.47	322,756
1885.....	65,171,937.12	3,392,576.34	68,564,513.46	345,125
1886.....	64,001,142.90	3,245,016.61	67,246,159.51	365,783
1887.....	73,752,997.08	3,753,400.91	77,506,397.99	406,007
1888.....	78,950,501.67	3,515,057.27	82,465,558.94	432,557
1889.....	88,842,720.58	3,466,968.40	92,309,688.98	489,725
1890.....	106,098,850.39	3,526,352.13	109,625,202.52	537,944
1891.....	117,312,690.50	4,700,636.44	122,013,326.94	676,160
1892.....	139,394,147.11	4,896,665.80	144,290,812.91	878,068
1893.....	156,906,637.94	4,867,734.42	161,774,372.36	968,012
1894.....	139,986,726.17	3,963,976.31	143,950,702.48	969,544
1895.....	139,812,294.30	4,338,020.21	144,150,314.51	970,524
1896.....	138,220,704.46	3,991,375.61	142,212,080.07	970,678
1897.....	139,949,717.35	3,987,783.07	143,937,500.42	976,014
1898.....	144,651,879.80	4,114,091.46	148,765,971.26	993,714
1899.....	138,355,062.95	4,147,517.73	142,502,580.68	991,519
1900.....	138,462,130.65	3,841,706.74	142,303,837.39	993,529
1901.....	138,531,488.84	3,968,795.44	142,400,284.28	997,735
1902.....	137,504,267.99	3,831,378.96	141,335,646.95	999,446
1903.....	137,759,653.71	3,993,216.79	141,752,870.50	996,545
1904.....	141,093,571.49	3,849,366.25	144,942,937.74	994,762
1905.....	141,142,861.33	3,721,832.82	144,864,694.15	996,441
1906.....	139,000,288.25	3,523,269.51	142,523,557.76	985,971
1907.....	138,155,412.46	3,309,110.44	141,464,522.90	967,371
1908.....	153,093,086.27	2,800,963.36	155,894,049.63	951,687
1909.....	161,973,703.77	2,862,583.73	164,836,287.50	946,194
1910.....	159,974,056.08	2,667,673.86	162,641,729.94	921,063
1911.....	167,326,160.35	2,517,127.06	169,843,287.41	892,096
1912.....	162,986,433.72	2,448,857.31	155,435,291.03	860,294
Total.....	4,286,922,719.65	123,328,719.05	4,410,251,438.70	.....

The cost of maintenance on account of improved methods and more economical administration is being gradually reduced each year. The cost for the fiscal year 1912 was \$403,726.42 less than for the fiscal year 1909.

In this connection attention is invited especially to the two provisions contained in the act approved August 17, 1912, making appropriations for the payment of pensions for the present fiscal year. This act provides for the abolishment of the pension agencies from and after the 31st day of January, 1913, and for the payment of pensions after that date by a disbursing clerk in the Bureau of Pensions. It also provides that not later than January 1, 1913, pensions shall be paid by checks drawn, under the direction of the Secretary of the Interior, in such form as to protect the United States against loss, without separate vouchers or receipts, except in certain cases. Pensions to inmates of the various branches of the National Home for Disabled Volunteer Soldiers will be paid to the treasurers of the different branches of the home as heretofore. There will be no change in the method of payment in such cases, nor will there be any change in the method of paying pensions in the cases of inmates of the Government Hospital for the Insane and the United States Soldiers' Home, Washington, D. C., nor in the cases in which pensions are paid through guardians. Vouchers in all such cases will be required as heretofore. It is also believed it will be necessary to require vouchers in the cases of all pensioners residing in foreign countries, and also in the case of widows who receive increase of pension on account of minor or helpless children. The payment of pensions without vouchers, as provided for in this act, is in accordance with the recommendations contained in my annual report for the fiscal year 1911.

This change in the method of paying pensions will save the expense of printing and distributing some 4,000,000 vouchers each year and the cost of furnishing nearly 4,000,000 penalty envelopes annually to pensioners in which to return vouchers for payment. It will also save the cost of transportation in carrying 4,000,000 pieces of mail each year which are now carried through the mails, free of postage, in the return penalty envelopes furnished to pensioners without charge. The greatest saving, however, will be in behalf of the pensioners themselves. Each pensioner is required to execute a voucher for each quarterly payment, or four vouchers per year. While many vouchers are executed free of expense by those authorized to administer oaths, it is estimated that the average cost per voucher is at least 25 cents, or \$1 per pensioner each year. There are some 4,000,000 vouchers executed each year, and a saving to pensioners will, therefore, be nearly \$1,000,000 per annum. The pensioners will also be enabled to receive their pension checks much more promptly than ever before. It is expected that the first payment, without vouchers, will be com-

menced on December 4, 1912. All checks will be prepared in advance and ready for mailing on the morning of the fourth day of the payment month. Checks for pensions due on December 4 will be mailed on that date.

The abolishment of the pension agencies and the payment of pensions by a disbursing clerk in this bureau will result in a much more efficient and economical administration than has ever been possible under the pension-agency system. Under the new system all duplication of records will be avoided. At the present time an order to inscribe is issued with each new certificate and becomes a part of the files of the pension agencies. These orders have been retained in each agency since the commencement of the pension system, and several millions of such orders will become useless upon the abolishment of the agencies and be disposed of as waste paper as soon as proper authority can be obtained from Congress. It is the practice in many of the agencies to have those orders bound in book form for ready reference, which has been of great expense. These orders to inscribe will no longer be necessary upon the abolishment of the pension agencies, as all of the original records of the bureau will become readily accessible for reference when required in connection with the payment of pensions.

Many pensioners are constantly changing their residences, and when they move into a different pension-agency district they usually desire to have their name transferred to another agency. Pensioners are constantly going from one National Soldiers' Home to another, and each time it is necessary to transfer their names from one pension agency roll to another agency. All this will be avoided upon the abolishment of the pension agencies. The large correspondence heretofore necessary between the bureau and the pension agencies will be discontinued. The bureau will be enabled to supply any information desired in regard to the post-office address of any pensioner, or the date to which payment was last made, immediately upon request. All such data will become a part of the bureau records here in Washington. Heretofore such information could only be obtained by drawing from the files the papers in each pension case to ascertain upon which agency the pensioner's name is inscribed in order to obtain from the pension agency the present post-office address of the pensioner, or the date to which payment was last made, or such information as might be desired before replying to request for information from correspondents.

It has been the practice to make a separate record in the bureau of every certificate issued, showing the number, date of issue, name of beneficiary, date of commencement, rate, etc. Upon receipt by the pension agencies of the certificate these data are also made a matter of record in the agencies. The record thus made in the agency is a

duplication of the record kept in the bureau. This has been necessary on account of the agencies being located in different cities where access to the records of the bureau could not be had. Upon the abolishment of the agencies and the transfer of all records to this bureau it will be necessary to keep one record only of the certificates issued, thus avoiding all duplication and relieving many clerks engaged in that class of work for assignment to other duties in connection with the adjudication of pension claims.

Upon the issuance of a pension certificate it is forwarded to the proper pension agency in whose district the beneficiary lives. There it is recorded and transmitted to the pensioner. It has been necessary heretofore, during the quarterly payments, to hold these certificates in the agency until the quarterly payment has been completed. They are then entered upon the roll, vouchers prepared, and forwarded to the address of the pensioner. Under the new system, certificates will be forwarded to the address of the pensioner by the bureau immediately upon being issued, together with a check for the amount due on such certificate from the date of commencement thereof. This will enable those receiving new certificates to receive their checks at a much earlier date than has been possible heretofore. After the pension agencies have been abolished and the payment without vouchers fully established, it is believed that the reduction in the cost of administration will amount to about \$250,000 per annum. Plans are being perfected as rapidly as possible to carry this legislation into effect at the earliest practicable date. The first payment, after the abolishment of the agencies, will be February 4, 1913, and it is confidently believed that all checks in payment of pensions falling due on that date will be ready for mailing on the morning of February 4, 1913.

PENSIONS OF THE SEVERAL WARS AND OF THE PEACE ESTABLISHMENT.

The amounts that have been paid for pensions to soldiers, sailors, and marines, their widows, minor children, and dependent relatives, on account of military and naval service in the several wars and in the regular service since the foundation of the Government to June 30, 1912, are as follows:

War of the Revolution (estimate).....	\$70,000,000.00
War of 1812 (service pension).....	45,890,843.39
Indian wars (service pension).....	11,713,609.51
War with Mexico (service pension).....	46,447,872.44
Civil War.....	4,129,699,071.99
War with Spain and insurrection in Philippine Islands.....	38,114,062.42
Regular establishment.....	25,014,227.67
Unclassified.....	16,488,476.49
Total disbursements for pensions.....	4,383,368,163.88

In Exhibit 5 is shown the number of pensioners by classes on the rolls of each of the agencies June 30, 1912, and the total number of pensioners on the rolls of each agency June 30, 1912, and June 30, 1911. There was a decrease in the number of pensioners at each of the agencies, the total decrease being 31,804, as has been shown elsewhere.

In Exhibit 6 is shown the number of pensioners in each State and Territory of the United States, in each insular possession, and in each foreign country at the close of the fiscal year, and the amounts paid to pensioners during the year in each of the localities mentioned. There are 854,622 pensioners residing in the different States and Territories, 207 residing in insular possessions, and 5,465 in foreign countries. Many of the pensioners whose checks are sent to them in foreign countries are residents of the United States but temporarily out of the country, either on business or pleasure. It is impossible to determine with any degree of accuracy the number of pensioners residing in foreign countries who are not citizens of the United States.

In Exhibit 7 is shown the number of pensioners of the various classes at each rate on the roll at the close of the year, except those pensioned by special acts of Congress, which is shown in Exhibit 8. Those pensioners on the roll at a less rate than \$6 per month are beneficiaries on account of service in the United States Navy, under allowances granted by the Secretary of the Navy, as provided in section 4757, United States Revised Statutes. There are no pensioners under the general pension laws at a rate less than \$6 per month.

In Exhibit 9 is shown the total number of pensioners on the roll by classes under the provisions of the general pension laws and the number, by classes, of those pensioned by special acts of Congress. The total annual value of each class at the close of the fiscal year is also shown in this exhibit. The total number of pensioners at the close of the year under the general pension laws was 838,210, and the annual value thereof was \$144,973,569.40. The number of pensioners on the roll, under special acts of Congress at the close of the year, was 22,084, and the annual value thereof was \$6,584,572. The annual value of the pension roll is the amount which would be required to pay all the pensioners on the roll at the close of the year for one entire year at the rates then existing should no new names be added to the roll and none be dropped therefrom. The annual value of the pension roll at the close of the year was \$151,558,141.40, a decrease as compared with the previous year of \$3,276,096.40.

Exhibit 10 is a statement of pension certificates issued during the year. The following summary shows the number by classes:

Pension certificates issued during the fiscal year.

Originals.....	22, 777	Renewals.....	1, 219
Increases.....	38, 817	Supplementals.....	155
Additional.....	9		
Reissues.....	27, 827	Total.....	90, 922
Restorations.....	118		

The classes may be defined as follows:

Originals.—Cases in which no pension has before been granted.

Increases.—Cases in which increased rates are granted.

Additional.—Issues under act of June 27, 1890, in lieu of pension under the general law.

Reissues.—Issues to allow for additional disabilities under the general law, to correct errors in former issues, and to allow pension under the general law, and under the acts of February 6, 1907, and May 11, 1912, in lieu of pension under other laws.

Restorations.—Issues to restore to the roll from date of last payment.

Renewals.—Issues to renew pension from a date new title is shown.

Supplementals.—Cases in which title exists under different laws and issue is made under one law for a period not covered by the other issue.

The number of pension certificates issued in the last 10 years is as follows:

Pension certificates issued during the last 10 years.

1903.....	132, 821	1909.....	123, 742
1904.....	153, 938	1910.....	97, 242
1905.....	185, 242	1911.....	92, 336
1906.....	136, 905	1912.....	90, 922
1907.....	236, 516		
1908.....	328, 676	Total.....	1, 578, 340

The number of certificates issued last year was the least issued in any year of the ten. The largest number was issued in 1908, the year most of the claims filed under the act of February 6, 1907, immediately after its passage, were adjudicated.

In addition to pension certificates, as above stated, there were also made during the year 2,835 reissues in lieu of certificates lost or destroyed, and allowances of accrued pension made in 19,493 cases, being issues for payment, in cases of deceased pensioners, from date of last payment to date of death.

Exhibit 11 is a summary of the pending files of the bureau at the close of the year, showing the number of claims of each class on file, as well as the number of each class based upon disabilities incurred or service rendered, in each of the wars and in the regular establishment.

The number of applications for pension pending at the close of the year was 422,464. The number pending at the beginning of the year was 36,793.

The increase is due to the large number of claims filed under the act of Congress approved May 11, 1912, more than 406,000 applications having been filed under that act between the date of its approval and the close of the fiscal year.

The following is a recapitulation of the pending files:

Claims pending at close of fiscal year, June 30, 1912.

Civil War.....	412, 388	Old wars.....	8
War with Spain.....	6, 762	Regular establishment.....	2, 420
Mexican War.....	773		
Indian wars.....	109	Total.....	422, 464
War of 1812.....	4		

In addition to the above there are many claims in the abandoned files of the bureau. If the prosecution of any of these claims is resumed and material evidence filed therein they will be restored to the pending files for adjudication.

There were also pending at the close of the year 28 claims for military bounty land warrants.

ACT OF FEBRUARY 6, 1907.

From the date of its approval to June 30, 1912, there were 680,146 applications filed under the act of February 6, 1907. During the last year 45,583 certificates were issued thereunder.

The following statement shows the number of certificates issued under this law each year:

Certificates issued under the act of February 6, 1907.

1907.....	119, 337	1911.....	55, 167
1908.....	257, 855	1912.....	45, 583
1909.....	67, 219		
1910.....	57, 634	Total.....	602, 795

Of the above only 23,097 were original allowances or pensions granted to persons never before on the roll.

This act has now been superseded by the act of May 11, 1912, as all survivors of the Mexican War are granted \$30 per month by the last-named act, and the rates provided by it for survivors of the Civil War are in excess of the rates provided by the former act.

There will be very few allowances hereafter under the act of 1907. No application executed and filed on or after May 11, 1912, will be adjudicated under that law.

ACT OF APRIL 19, 1908.

The second section of the act of April 19, 1908, grants pension at the rate of \$12 per month to widows of persons who served 90 days or more in the Army or Navy of the United States during the Civil War, and who were honorably discharged, without regard to their pecuniary condition, if they were married prior to June 27, 1890.

The records show that prior to the close of the last fiscal year 84,906 certificates had been issued under this law.

While this is the number of certificates that have been issued under this act since its passage the number of widow pensioners now borne on the roll thereunder is very much larger. As the first section of this act increased from \$8 to \$12 per month the pensions of all widows on the roll under the act of June 27, 1890, the names of all widows on the roll under that law were transferred to the roll under the act of April 19, 1908, immediately after its enactment.

Since 1908 no widow pensioners have been borne on the roll under the act of June 27, 1890.

ACT OF MAY 11, 1912.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That any person who served ninety days or more in the military or naval service of the United States during the late Civil War, who has been honorably discharged therefrom, and who has reached the age of sixty-two years or over, shall, upon making proof of such facts, according to such rules and regulations as the Secretary of the Interior may provide, be placed upon the pension roll and be entitled to receive a pension as follows: In case such person has reached the age of sixty-two years and served ninety days, thirteen dollars per month; six months, thirteen dollars and fifty cents per month; one year, fourteen dollars per month; one and a half years, fourteen dollars and fifty cents per month; two years, fifteen dollars per month; two and a half years, fifteen dollars and fifty cents per month; three years or over, sixteen dollars per month. In case such person has reached the age of sixty-six years and served ninety days, fifteen dollars per month; six months, fifteen dollars and fifty cents per month; one year, sixteen dollars per month; one and a half years, sixteen dollars and fifty cents per month; two years, seventeen dollars per month; two and a half years, eighteen dollars per month; three years or over, nineteen dollars per month. In case such person has reached the age of seventy years and served ninety days, eighteen dollars per month; six months, nineteen dollars per month; one year, twenty dollars per month; one and a half years, twenty-one dollars and fifty cents per month; two years, twenty-three dollars per month; two and a half years, twenty-four dollars per month; three years or over, twenty-five dollars per month. In case such person has reached the age of seventy-five years and served ninety days, twenty-one dollars per month; six months, twenty-two dollars and fifty cents per month; one year, twenty-four dollars per month; one and a half years,

twenty-seven dollars per month; two years or over, thirty dollars per month. That any person who served in the military or naval service of the United States during the Civil War and received an honorable discharge, and who was wounded in battle or in line of duty and is now unfit for manual labor by reason thereof, or who from disease or other causes incurred in line of duty resulting in his disability is now unable to perform manual labor, shall be paid the maximum pension under this Act, to wit, thirty dollars per month, without regard to length of service or age.

That any person who has served sixty days or more in the military or naval service of the United States in the War with Mexico and has been honorably discharged therefrom, shall, upon making like proof of such service, be entitled to receive a pension of thirty dollars per month.

All of the aforesaid pensions shall commence from the date of filing of the applications in the Bureau of Pensions after the passage and approval of this Act: *Provided*, That pensioners who are sixty-two years of age or over, and who are now receiving pensions under existing laws, or whose claims are pending in the Bureau of Pensions, may, by application to the Commissioner of Pensions, in such form as he may prescribe, receive the benefits of this act; and nothing herein contained shall prevent any pensioner or person entitled to a pension from prosecuting his claim and receiving a pension under any other general or special act: *Provided*, That no person shall receive a pension under any other law at the same time or for the same period that he is receiving a pension under the provisions of this act: *Provided further*, That no person who is now receiving or shall hereafter receive a greater pension, under any other general or special law, than he would be entitled to receive under the provisions herein shall be pensionable under this act.

SEC. 2. That rank in the service shall not be considered in applications filed hereunder.

SEC. 3. That no pension attorney, claim agent, or other person shall be entitled to receive any compensation for services rendered in presenting any claim to the Bureau of Pensions, or securing any pension, under this act, except in applications for original pension by persons who have not heretofore received a pension.

SEC. 4. That the benefits of this act shall include any person who served during the late Civil War, or in the War with Mexico, and who is now or may hereafter become entitled to pension under the acts of June twenty-seventh, eighteen hundred and ninety, February fifteenth, eighteen hundred and ninety-five, and the joint resolutions of July first, nineteen hundred and two, and June twenty-eighth, nineteen hundred and six, or the Acts of January twenty-ninth, eighteen hundred and eighty-seven, March third, eighteen hundred and ninety-one, and February seventeenth, eighteen hundred and ninety-seven.

SEC. 5. That it shall be the duty of the Commissioner of Pensions, as each application for pension under this act is adjudicated, to cause to be kept a record showing the name and length of service of each claimant, the monthly rate of payment granted to or received by him, and the county and State of his residence; and shall at the end of the fiscal year nineteen hundred and fourteen tabulate the

record so obtained by States and counties, and shall furnish certified copies thereof upon demand and the payment of such fee therefor as is provided by law for certified copies of records in the executive departments.

This act grants pensions according to the length of service to persons who served 90 days or more in the military or naval service of the United States during the Civil War and were honorably discharged, who have reached certain ages, at rates as indicated in the following table:

Length of service.

Age.	90 days.	6 months.	1 year.	1½ years.	2 years.	2½ years.	3 years.
62.....	\$13.00	\$13.50	\$14.00	\$14.50	\$15.00	\$15.50	\$16.00
66.....	15.00	15.50	16.00	16.50	17.00	18.00	19.00
70.....	18.00	19.00	20.00	21.50	23.00	24.00	25.00
75.....	21.00	22.50	24.00	27.00	30.00	30.00	30.00

It also grants pensions at the maximum rate, \$30 per month, without regard to age or length of service, to persons who served in the military or naval service during the Civil War and received honorable discharges, and who were wounded in battle or in line of duty and are now unfit for manual labor by reason thereof, or who from disease or other causes incurred in line of duty resulting in their disabilities are now unable to perform manual labor.

It also provides a rate of \$30 per month for surviving soldiers and sailors of the Mexican war who served 60 days or more and were honorably discharged.

Immediately after the approval of the act the bureau had a large number of blank forms of declarations printed for the use of beneficiaries under the law, and over 600,000 such blanks were furnished to Members of Congress, Grand Army posts, and soldiers' homes, and to many individual soldiers and sailors who made requests for them.

From the date of approval of the act to the close of the fiscal year, June 30, 1912, the bureau received 406,048 applications for pensions thereunder.

The following statement shows the number received each day during that time:

May 11.....	1	May 24.....	25,055	June 7.....	5,261	June 20.....	1,994
May 13.....	325	May 25.....	22,528	June 8.....	5,000	June 21.....	1,723
May 14.....	951	May 27.....	30,376	June 10.....	7,340	June 22.....	1,633
May 15.....	5,828	May 28.....	17,380	June 11.....	2,740	June 24.....	2,042
May 16.....	7,392	May 29.....	20,034	June 12.....	3,706	June 25.....	1,231
May 17.....	10,728	May 31.....	23,630	June 13.....	3,246	June 26.....	1,469
May 18.....	14,846	June 1.....	13,111	June 14.....	2,699	June 27.....	1,301
May 20.....	37,943	June 3.....	15,110	June 15.....	2,349	June 28.....	1,015
May 21.....	21,404	June 4.....	5,623	June 17.....	3,695	June 29.....	1,156
May 22.....	35,362	June 5.....	7,530	June 18.....	1,637		
May 23.....	29,328	June 6.....	7,445	June 19.....	2,080		
						Total.....	406,048

Receipts for these claims were sent to all applicants as soon as it was possible to do so, and the declarations were then examined to see whether or not they had been properly signed and sworn to in order that there might be no delay in calling for new ones in cases in which the execution was invalid.

The clerical force of the bureau was at once rearranged and adjusted to meet the conditions imposed upon it by the receipt of so many new applications, and within a very short time after the passage of the act the work of adjudicating the claims was commenced.

Before the close of the fiscal year, or within a little over a month and a half after the act was approved, 13,404 certificates had been issued thereunder.

TEN YEARS' SUMMARY.

The following table shows the operations of the bureau in the adjudication of pension claims each year for the past 10 years. "No benefit cases" are allowances under one law when the claimants are already in receipt of pension at an equal or higher rate under another law. As two pensions under different laws can not be paid to the same person covering the same period, the applicant in a case of this kind is permitted to elect which pension he will receive.

Summary of work for 10 years ending June 30, 1912.

Year.	Cases on hand.	Office force.	Applications filed.	Admissions.	Rejections.	No benefit cases.	Total number of cases adjudicated.
1903.....	304,809	1,736	225,871	130,109	113,794	8,203	252,106
1904.....	285,523	1,734	254,333	151,211	108,114	8,725	268,060
1905.....	220,322	1,709	217,435	182,207	81,853	4,915	265,975
1906.....	182,453	1,684	201,322	138,809	82,938	4,943	226,690
1907.....	356,181	1,634	440,517	238,249	60,573	3,892	302,715
1908.....	123,483	1,464	185,622	325,140	56,449	3,403	387,992
1909.....	66,226	1,385	152,009	123,610	52,199	1,772	177,581
1910.....	47,286	1,317	132,012	97,207	38,032	1,198	136,437
1911.....	36,793	1,222	120,814	92,274	30,980	1,065	124,319
1912.....	422,464	1,172	508,812	91,120	24,925	623	116,668

SPECIAL ACTS.

Since 1861 there have been granted by special acts of Congress 39,472 pensions and increases of pensions, of which 22,084 are now on the roll, with an annual face value of \$6,584,572. Only a part of this is properly chargeable to special acts, as most of the beneficiaries had been previously pensioned under the general laws at lower rates.

Up to and including June 30, 1912, during the second session of the Sixty-second Congress 3,485 persons were included in the special acts passed at the rates specified in the summary following:

Pensions granted by special act during the second session of the Sixty-second Congress to and including June 30, 1912.

Rates specified.	Number granted.	Rates specified.	Number granted.
\$100.....	1	\$24.....	773
\$72.....	1	\$20.....	254
\$65.....	1	\$17.....	2
\$60.....	1	\$16.....	22
\$50.....	75	\$15.....	5
\$45.....	1	\$12.....	205
\$40.....	134	\$10.....	1
\$36.....	286	\$8.....	2
\$35.....	1		
\$30.....	1,706	Total.....	3,485
\$25.....	14		

Of the above, 215 were granted to persons not in receipt of pensions, and 3,270 to persons then receiving smaller pensions.

The annual value of said special-act pensions is \$1,174,716, and the annual increase due to the same is \$579,168.

The following statement shows the number of pensions and increases of pensions granted by special acts during each Congress since March 4, 1861:

Number of pensions granted by special acts each Congress since Mar. 4, 1861.

Congress.	Number.	Congress.	Number.
Thirty-seventh (1861-1863).....	12	Fifty-first (1889-1891).....	1,388
Thirty-eighth (1863-1865).....	27	Fifty-second (1891-1893).....	217
Thirty-ninth (1865-1867).....	138	Fifty-third (1893-1895).....	119
Fortieth (1867-1869).....	275	Fifty-fourth (1895-1897).....	378
Forty-first (1869-1871).....	85	Fifty-fifth (1897-1899).....	594
Forty-second (1871-1873).....	167	Fifty-sixth (1899-1901).....	1,391
Forty-third (1873-1875).....	182	Fifty-seventh (1901-1903).....	2,171
Forty-fourth (1875-1877).....	98	Fifty-eighth (1903-1905).....	3,355
Forty-fifth (1877-1879).....	230	Fifty-ninth (1905-1907).....	6,030
Forty-sixth (1879-1881).....	96	Sixtieth (1907-1909).....	6,600
Forty-seventh (1881-1883).....	216	Sixty-first (1909-1911).....	9,649
Forty-eighth (1883-1885).....	598	Sixty-second (1911 to June 30, 1912).....	3,485
Forty-ninth (1885-1887).....	856		
Fiftieth (1887-1889).....	1,015	Total.....	39,472

CRIMINAL AND CIVIL SUITS.

There were 77 new cases presented by the bureau to the Department of Justice for prosecution on account of offenses against the pension laws, and indictments were found in 40 cases.

There were 35 cases brought to trial during the year, in 34 of which convictions were secured. Only two of these cases were against persons known to have rendered military or naval service. At the close of the year there were 116 cases pending in the hands of United States attorneys.

One civil suit was instituted and one was dismissed. There were four suits pending in the courts at the close of the year.

The sum of \$3,448.04 was recovered through refundments.

BOUNTY-LAND WARRANTS.

During the year five original bounty-land warrants were issued, three for 160 acres each and two for 120 each, aggregating 720 acres.

A duplicate warrant was also issued in lieu of one for 160 acres that had been lost. Service to give title to bounty land must have been for at least 14 days, or in a battle, prior to March 3, 1855, and if in the Regular Army or Navy must have been in some war.

The following statement shows the total number of bounty-land warrants of all classes issued by the bureau (including partial estimate of those issued for service in the Revolutionary War) and the number of acres granted to June 30, 1912:

Bounty-land warrants issued to June 30, 1912.

	Number.	Acres.
War of the Revolution.....	16,663	2,666,080
War of 1812, acts prior to 1850.....	29,471	4,891,520
Act of 1847, Mexican War.....	88,274	13,213,640
Act of 1850, War of 1812, Mexican and Indian wars.....	189,146	13,168,560
Act of 1852, War of 1812, Mexican and Indian wars.....	11,992	694,400
Act of 1855, War of 1812, Mexican and Indian wars.....	263,144	34,158,070
Total.....	598,690	68,792,270

This bureau has no record of the warrants issued directly from the General Land Office under special acts of Congress or of those issued on account of the Virginia military land grants satisfied by the United States after the cession of the Northwestern Territory, and they are not included in the above table.

APPEALS.

To carry into effect the instructions of the Assistant Secretary of the Interior contained in the revised rules of practice in pension and bounty land appeals, dated August 15, 1911, I established September 1, 1911, a board composed of both legal and medical examiners of ability and experience, which has been designated as the Board of Reconsideration. All appeals as soon as they are filed in the bureau are forwarded to said board. The cases are then drawn from the files and all the evidence carefully reconsidered by the members of the board to determine whether or not the action of the bureau was correct and should be adhered to. In about 15 per cent of the cases in which appeals were filed since September 1, 1911, the

bureau on the recommendation of said board receded from its action and the claims were reopened for further consideration and readjudication. In the other 85 per cent of the cases the action was adhered to and the appeals forwarded to the department for its action.

Aside from appeals in claims filed by deserted wives for division of pension and appeals relating to fees, there were 935 decisions rendered by the department prior to the close of the fiscal year on appeals taken on or after September 1, 1911. In 882 of these cases the action of the bureau was affirmed, and in 53 cases its action was reversed. There were, however, a number of these cases in which the action of the department was not in its true sense a reversal of the bureau. There were 13 cases in which the appeals were forwarded to the department with a statement that the bureau was willing to recede from its action in part, and the department in each of said cases concurred in the action recommended, yet noted the action as a reversal. There were also 2 cases wherein the bureau receded from its action which by some inadvertence were forwarded to the department and formal action was taken reversing the bureau. Eliminating these 15 cases from the calculation, the percentage of cases in which the action of the bureau was reversed was only a little over 4 per cent of those decided.

The percentage of reversals in cases decided during the entire year—that is, from June 30, 1911, to June 30, 1912—was slightly in excess of this.

LENGTH OF CIVIL WAR SERVICE.

The estimates made upon the various bills introduced into Congress based upon length of service have been severely criticized on the ground that such estimates gave the average length of service as far in excess of the actual service rendered during the Civil War.

The statistics relative to the length of service of the Civil War survivors were based on claims settled by the bureau soon after the passage of the act of June 27, 1890. Statistical cards were then made out in the cases of 475,237 survivors of the Civil War showing the date of enlistment and the date of discharge in each case. It was found upon compiling the data thus obtained that 71 per cent of the cases handled showed a service of one year and more during the Civil War.

The act of May 11, 1912, contains a provision requiring a record to be kept showing the name and length of service of each claimant and the monthly rate of payment granted to or received by him and the county and State of his residence. The number of cases in which such record has been kept to June 30, 1912, is 13,266.

The length of service shown in these cases is as follows:

Length of service.	Percent- age.	Number.
Ninety days and less than six months.....	0.087	884
Six months and less than one year.....	.123	1,630
One year and less than one and one-half years.....	.106	1,305
One and one-half years and less than two years.....	.087	1,287
Two years and less than two and one-half years.....	.068	903
Two and one-half years and less than three years.....	.192	2,546
Three years and over.....	.348	4,612
Total.....		12,286

It will be seen that the number of survivors in the cases adjudicated under the act of May 11, 1912, up to June 30, 1912, who served one year or more is 81 per cent.

During the month of July 16,106 claims were adjudicated under the act of May 11, 1912, and of this number 12,428, or 77 per cent, served one year or more.

It will be seen, therefore, that the average length of service used by this bureau in all of the estimates submitted was too low rather than too high. This was due to the fact that when the statistical cards were collected under the act of June 27, 1890, many of the claimants who had rendered two or more services alleged but one of them.

Under the practice during the first few years after the passage of the act of June 27, 1890, claimants were not required to state whether any service was rendered other than the one alleged. This practice was subsequently changed and claimants required to allege all the various services rendered. It has been found, however, since the passage of the act of May 11, 1912, that quite a number of claimants under this act rendered other service than that heretofore alleged.

HISTORICAL.

There are now no pensioners on account of the Revolutionary War on the roll. The last widow pensioner of that war was Esther S. Damon, of Plymouth Union, Vt., who died November 11, 1906, aged 92 years. The last survivor of the Revolution was Daniel F. Bakeman, who died at Freedom, Cattaraugus County, N. Y., April 5, 1869, aged 109 years 6 months and 8 days.

The last surviving pensioned soldier of the War of 1812 was Hiram Cronk, of Ava, N. Y., who died May 13, 1905, aged 105 years and 16 days. The names of 238 widows of the War of 1812 remained on the pension roll June 30, 1912.

MISCELLANEOUS.

There were 1,427 claims for reimbursement for expenses of the last sickness and burial of deceased pensioners pending at the beginning of the year; 7,605 such claims were received during the year,

and 133 which had been disallowed were reopened, making a total of 9,165. Of these, 6,005 were allowed, 1,126 disallowed, and 814 abandoned, leaving 1,220 pending at the close of the year.

The mail received during the year numbered 1,486,577 pieces, and the outgoing mail aggregated 1,201,923 pieces, making a total of 2,688,500 handled, an average of nearly 8,700 daily.

During the year 116,668 pension claims were adjudicated, of which 91,120 were admitted, 24,925 rejected, and 623 approved in which no certificates were issued because they would not have benefited the applicants. There were also 28 claims for military bounty-land warrants adjudicated, of which 7 were allowed and 21 rejected.

Since the passage of the act of March 3, 1899, providing for the division of pension of resident pensioners of the United States who desert their wives and children or who are inmates of national or State soldiers' and sailors' homes, 14,021 claims have been filed thereunder, 7,675 of which have been allowed and 6,182 rejected, leaving 164 pending.

During the year the names of 130 pensioners were dropped from the roll for various causes after due legal notice had been given. The pensions of 29 persons were reduced, and reissues were made in 64 cases to recover erroneous payments.

Most of the surgeons appointed to examine applicants for pension are organized into boards of three members each; but it is sometimes necessary to have single surgeons or specialists make examinations of claimants who can not go before a board or who require the attention of a specialist. On June 30, 1912, there were 4,601 examining surgeons, and during the year 21,670 examinations were made, at an expense of \$170,782.

During the year 508,812 applications for pension or increase of pension were received in the bureau. There were also received 5,927 applications for accrued pension due at death of pensioners, 7,605 applications for reimbursement for the expenses of the last sickness and burial of deceased pensioners, 521 applications for division of pension, and 31 applications for military bounty-land warrants.

There were 2,926 cases for special examination on hand July 1, 1911, and 5,517 were referred during the year for such examination, making a total of 8,443. Of these, 5,649 were disposed of, leaving 2,794 on hand June 30, 1912.

The average number of special examiners in the field during the year was 124.

Very respectfully,

J. L. DAVENPORT,
Commissioner of Pensions.

The SECRETARY OF THE INTERIOR.

EXHIBIT 1.—*Pensioners added to and dropped from the roll at the beginning and at the close of the year, and the amount disbursed to each class of pensioners during the year ended June 30, 1912.*

Classes.	Gains to roll.			Gains to classes by transfer from other classes.				Losses to roll.				Losses to classes.	Number on roll at end of year.	Disbursements.		
	Original.	Restoration.	Renewal.	Original.	Restoration.	Renewal.	Additional.	Reissue.	By death.	By remarriage.	By limitation.				Failure to claim.	Other casualties.
Regular establishment.																
Army Invalids.....	10,660	715	4						1	309		17	18	22	11,020	\$1,845,475.63
Army widows, etc.....	2,721	228	1						3	87	22	1	1		2,824	548,678.73
Navy Invalids.....	3,067	408	3							132		7	26	4	3,353	587,998.57
Navy widows, etc.....	1,458	152				1				73	12	2		1	1,516	326,621.38
Civil War.																
Act May 11, 1912:																
Army.....	2								12,362	5				5	12,354	21,325.83
Navy.....									892						892	2,604.11
Act Feb. 6, 1907:																
Army.....	343,820	1,177	19						11,509	22,622		49	24	12,137	321,825	59,187,762.22
Navy.....	13,010	139	2						373	583		9	3	877	11,754	2,186,498.31
General law.																
Army Invalids.....	111,924	11	6			3	649	1,148	7,986			19	8	4,141	102,186	29,635,280.78
Army nurses.....	406								44						363	55,427.83
Army widows, etc.....	69,929	646	10			1	20	104	4,724	157	80	23	16	21	66,034	10,847,018.83
Navy Invalids.....	1,139						5	35	90					38	1,061	301,074.06
Navy widows, etc.....	981	3	1					2	71	1		1	1		913	160,267.37
Act June 27, 1890:																
Army Invalids.....	57,960	123	20			1		2,365	2,365			66	17	9,491	45,659	7,471,480.10
Army nurses, etc.....	4,208	820	47						13	13		739	10	3	4,322	981,723.45
Navy Invalids.....	2,041	12	3						121	121		6		387	243,866.06	
Navy nurses, etc.....	180	24	9								24	2			157	30,064.16
Act Apr. 19, 1908:																
Army Invalids.....	219,238	16,412	22			2			11,064	648		51	39	109	223,873	82,113,717.21
Navy widows.....	8,960	565	1						437	8		2	1	3	9,075	1,816,603.89
War with Spain.																
Army Invalids.....	22,644	813	18					1	320			18	57	1	23,097	8,021,862.76
Army widows, etc.....	4,817	192	8						169	88		9	10	2	4,734	789,612.08
Navy Invalids.....	789	28							19			1	1		744	106,628.47
Navy widows, etc.....	280	6	1						14	4		3			276	80,462.80

EXHIBIT 1.—*Pensioners added to and dropped from the roll, the number on the roll at the beginning and at the close of the year, and the amount disbursed to each class of pensioners during the year ended June 30, 1912—Continued.*

Classes.	Number of pensioners at beginning of year.	Gains to roll.			Gains to classes by transfer from other classes.					Losses to roll.				Losses to classes.	Number on roll at end of year.	Disbursements.
		Original.	Restoration.	Re-natural.	Restoration.	Re-natural.	Additional.	Re-issue.	By death.	By remarriage.	By limitation.	Fallure to claim.	Other causes.			
<i>War of 1812.</i>																
Widows.....	279								41						238	\$37,819.20
<i>War with Mexico.</i>																
Survivors.....	1,639							1	328			1		1	1,313	341,756.88
Widows.....	5,982	144			1		3		583	5		1	4	1	5,533	826,428.73
<i>Indian wars.</i>																
Survivors.....	1,387	7							182			2			1,210	148,853.04
Widows.....	2,629	87							272	4		1			2,439	372,550.95
Total.....	892,068	22,712	164	435	4	25	779	2	52,863	799	929	265	229	27,241	960,294	152,966,106.22

Amount disbursed on account of regular establishment..... \$3,208,375.31
 Amount disbursed on account of Civil War..... 143,979,235.05
 Amount disbursed on account of War with Spain..... 3,871,093.05
 Amount disbursed on account of War of 1812..... 37,819.20
 Amount disbursed on account of War with Mexico..... 1,168,185.61
 Amount disbursed on account of Indian wars..... 621,403.99
 Amount disbursed by Treasury settlements..... 328.50

EXHIBIT 2.—Number and amount of first payments in original, increase, reissue, restoration, and other cases made during the fiscal year ended June 30, 1912.

Class.	Original.		Increase and reissue.		Supplemental.		Additional.		Restoration and renewal.		Amount.	
	Num-ber.	Amount.	Num-ber.	Amount.	Num-ber.	Amount.	Num-ber.	Amount.	Num-ber.	Amount.	Num-ber.	Total.
Regular establishment:												
Army.....	693	\$79,803.45	668	\$28,164.73	1	\$75.07			6	\$1,228.60	1,357	\$106,372.83
{Invalids.....	210	\$3,010.15	6	565.23					2	271.20	1,213	\$3,546.58
{Widows, etc.....	305	\$3,769.22	153	6,146.92					26	2,360.55	574	\$4,276.69
Navy.....	133	\$4,817.00	3	\$19.47	1	26.37					142	\$4,846.74
Civil War, act May 11, 1912:												
Army.....			1,046	6,789.36							1,046	6,789.36
{Invalids.....			206	1,306.22							206	1,306.22
Navy.....												
Civil War, act Feb. 6, 1907:												
Army.....	1,224	\$117,826.56	45,006	1,486,626.16	4	16.20			126	20,492.07	46,380	1,624,960.99
{Invalids.....	139	\$10,240.87	1,580	63,066.76					4	1,285.40	1,723	75,882.53
Civil War, general law:												
Army.....	8	\$3,330.01	4,670	232,175.44	19	14,227.96			506	24,339.08	5,203	274,072.42
{Invalids.....			1	48.53							1	48.53
{Nurses.....			195	20,515.62	6	633.74			312	37,177.48	1,100	161,993.83
{Widows, etc.....	596	\$108,637.90	43	2,201.47	1	266.80			4	136.74	56	2,448.92
Navy.....	8	\$369.81	4	223.07					1	22.40	10	613.47
Civil War, act June 27, 1890:												
Army.....	104	\$50,384.03	93	4,091.24	45	15,963.93			31	15,425.59	279	\$7,073.12
{Invalids.....	772	\$186,444.32	10	353.86	2	878.26	6	\$1,208.33	16	3,360.06	800	190,536.50
{Minors, etc.....	9	\$2,545.12	4	380.27	2	910.83			3	996.74	18	4,332.46
Navy.....	26	\$3,669.78									25	\$3,669.78
Civil War, act Apr. 19, 1908:												
Army.....	16,358	\$62,262.08	141	7,807.40	29	15,840.87			23	11,638.93	16,551	\$97,558.28
{Invalids.....	718	\$55,394.02	17	268.00	2	2,896.54			1	9.20	728	\$5,317.76
War with Spain:												
Army.....	743	\$265,104.01	1,089	32,593.24	1	253.20			33	7,040.71	1,866	\$296,981.16
{Invalids.....	178	\$7,216.53	1	15.80					8	545.73	182	\$7,778.11
{Widows, etc.....	26	\$3,361.64	18	1,267.13					1	5.80	45	\$4,637.57
Navy.....	7	\$60.00							1	61.87	8	\$61.87
War of 1812.....												
{Invalids.....			18	208.45	2	2,062.00					21	\$2,270.45
War with Mexico.....	142	\$23,508.74	1	36.00							143	\$23,544.74
{Invalids.....	6	\$4,495.48	16	487.77							21	\$4,983.25
Indian wars.....	88	\$20,688.55									88	\$20,688.55
Total.....	22,577	\$2,022,862.09	54,979	1,891,508.14	115	53,505.10	6	\$1,208.33	1,109	126,401.15	78,781	\$4,065,802.81

EXHIBIT 3.—Appropriations for pensions and disbursements on account thereof for the fiscal year ended June 30, 1912, and unexpended balances at close of year.

Items of appropriation.	Appropriations.			Disbursements.			Balances.			
	Amount appropriated, act Mar. 3, 1911.	Amount appropriated, act Mar. 4, 1911.	Repay-ments to the appro- priation.	Total.	Amount disbursed by United States pension agents.	Amount disbursed by Treasury settle-ments.	Total amount disbursed.	Balance re-maining in the hands of United States pen-sion agents, June 30, 1912.	Balance remaining in the United States Treasury, June 30, 1912.	Available balance June 30, 1912.
Army pensions.....	\$147,673,500.00		\$4,580.46	\$147,678,080.46	\$147,666,283.14	\$328.50	\$147,666,611.64	\$11,419.17	\$49.65	\$11,468.82
Navy pensions.....	5,326,500.00		147.43	5,326,647.43	5,319,822.08		5,319,822.08	6,668.04	127.31	6,826.35
Total pensions.....	153,000,000.00		4,727.89	153,004,727.89	152,986,105.22	328.50	152,986,433.72	18,117.21	176.96	18,294.17
Fees of examining surgeons, pen-sions.....	200,000.00		15.00	200,015.00	128,206.17		128,206.17	66,738.83	5,015.00	71,808.83
Salaries and expenses of pension agents:										
Salaries, pension agents.....	72,000.00			72,000.00	71,833.33		71,833.33		166.67	166.67
Clerk hire, pension agencies.....	385,000.00		3.00	385,003.00	376,820.45		376,820.45	8,182.55		8,182.55
Rent, for pension agency at New York, N. Y.....		\$4,500.00		4,500.00	4,250.00		4,250.00		250.00	250.00
Contingent expenses, pension agencies.....	25,000.00		1.39	25,001.39	3,769.87	1,647.35	5,317.22	970.38	15,713.79	19,684.17
Total.....	482,000.00	4,500.00	4.39	486,504.39	456,673.65	1,647.35	468,221.00	9,152.93	19,130.46	28,283.39
Grand total.....	153,682,000.00	4,500.00	4,747.28	153,691,247.28	153,570,985.04	1,875.85	153,572,860.89	94,083.97	24,322.42	118,386.39

In addition to the above there were disbursed during the fiscal year ended June 30, 1912, the following sums, chargeable to the appropriation for the fiscal year ended June 30, 1911:

Fees of examining surgeons, pensions, pension agent at Washington, D. C.....	\$48,324.17
Fees of examining surgeons, pensions, by Treasury settlements.....	717.00
Total.....	49,041.17

Of the amount, \$4,319,822.06 disbursed for Navy pensions \$367,009.40 was paid from the Navy pension fund under act of Mar. 3, 1911.

EXHIBIT 4.—Amount disbursed at United States pension agencies during the fiscal year ended June 30, 1912, as shown by accounts current.

Agency.	Pensions.			Fees of examining surgeons, pensions.	Salaries.	Clerk hire.	Rent.	Contingent expenses.	Grand total.
	Army.	Navy.	Total.						
Augusta.....	\$2,723,930.99		\$2,723,930.99		\$4,000.00	\$7,512.83		\$44.43	\$2,735,488.25
Boston.....	7,781,460.94	\$1,087,845.43	8,869,306.37		4,000.00	21,050.94		199.57	8,894,556.88
Buffalo.....	6,575,001.85		6,575,001.85		4,000.00	18,410.67		188.30	6,597,600.82
Chicago.....	10,965,061.11	1,080,982.00	12,046,043.11		4,000.00	25,832.58		382.86	12,076,248.53
Columbus.....	15,327,896.05		15,327,896.05		4,000.00	35,161.91		552.79	15,367,610.75
Concord.....	2,634,532.10		2,634,532.10		4,000.00	7,400.00		56.19	2,645,988.29
Des Moines.....	8,606,890.31		8,606,890.31		4,000.00	21,635.33		151.15	8,632,676.79
Detroit.....	6,514,999.97		6,514,999.97		4,000.00	17,690.67		169.56	6,536,800.20
Indianapolis.....	10,345,011.65		10,345,011.65		4,000.00	20,152.83		174.18	10,369,338.66
Knoxville.....	9,670,071.58		9,670,071.58		4,000.00	25,000.00		130.50	9,699,202.08
Louisville.....	4,094,938.93		4,094,938.93		4,000.00	11,525.34		99.10	4,110,563.37
Milwaukee.....	8,086,235.57		8,086,235.57		4,000.00	18,102.65		77.88	8,108,416.10
New York.....	7,208,611.47	1,021,002.49	8,229,613.96		3,833.33	29,361.67	\$4,250.00	148.33	8,261,207.29
Philadelphia.....	7,959,980.17	645,285.75	8,605,274.92		4,000.00	21,365.84		286.28	8,630,927.04
Pittsburgh.....	6,876,025.92		6,876,025.92		4,000.00	18,916.84		222.74	6,899,165.50
San Francisco.....	6,885,381.22	361,706.41	7,247,087.63		4,000.00	20,493.33		156.62	7,321,737.58
Topeka.....	17,666,463.91		17,666,463.91		4,000.00	37,837.05		254.39	17,708,555.35
Washington.....	7,965,790.40	1,123,000.00	8,816,790.40	\$128,206.17	4,000.00	25,400.00		475.00	8,974,871.57
Total.....	147,666,263.14	5,319,822.08	152,986,105.22	128,206.17	71,833.33	376,820.45	4,250.00	3,799.87	153,570,965.04

EXHIBIT 5.—Number of pensioners, by classes, on the rolls of each agency, together with the number on the rolls June 30, 1918 and 1911—Continued.

Agency.	Civil War—Contd.		War with Spain.				War of 1912.		War with Mexico.		Indian wars.		Number of pensioners.	
	Act of Apr. 19, 1908.													
			Army.		Navy.									
	Army.	Navy.	Invalids.	Widows, etc.	Invalids.	Widows, etc.	Widows.		Survivors.	Widows.	Survivors.	Widows.	June 30, 1912.	June 30, 1911.
Augusta.....	3,146		274	47			5	3	24			2	14,611	15,287
Boston.....	15,638	2,210	679	363	97	36	5	12	73		4	12	53,292	54,538
Buffalo.....	10,127		842	403			18	11	41			5	36,904	38,292
Chicago.....	16,031	1,530	1,451	268	149	33	16	112	380		7	49	67,671	69,965
Columbus.....	21,494		2,527	336			17	61	191		5	11	84,289	87,603
Concord.....	3,314		342	57			3	2	20			1	13,595	14,213
Des Moines.....	11,767		1,005	147			3	47	192		7	23	47,644	49,597
Detroit.....	8,421		1,421	212			3	16	57		1	6	35,634	36,917
Indianapolis.....	11,734		2,063	172			13	61	249		1	11	53,908	55,841
Knorrville.....	14,001		2,341	621			68	314	1,808		399	1,428	56,340	59,253
Louisville.....	6,161		1,058	236			8	59	318		2	10	28,396	29,284
Milwaukee.....	10,822		1,238	221			6	28	86		3	17	44,289	45,721
New York.....	15,317	2,105	912	394	135	48	11	37	140		3	10	48,471	50,378
Philadelphia.....	16,511	1,362	802	261	74	31	5	24	115		1	10	50,569	52,669
Pittsburgh.....	12,762		763	139			2	13	69		1	1	38,794	40,863
San Francisco.....	9,281	363	1,681	232	101	21	3	237	657		678	656	42,928	43,766
Topeka.....	26,456		1,983	310			11	201	763		83	150	96,262	102,828
Washington.....	10,889	1,505	1,716	536	188	106	44	75	350		15	37	49,697	50,663
Total.....	223,872	9,075	23,097	4,794	744	275	238	1,313	6,533		1,210	2,439	890,294	892,098

EXHIBIT 6.—*Number of pensioners in each State and Territory, each insular possession, and each foreign country on the rolls June 30, 1912, and the amounts paid therein during the fiscal year 1912.*

State or Territory.	Number.	Amount.	State or Territory.	Number.	Amount.
Alabama.....	3,585	\$608,703.59	FOREIGN COUNTRIES—		
Alaska.....	74	13,810.53	continued.		
Arizona.....	852	117,785.71	Bermuda.....	5	\$1,044.00
Arkansas.....	10,438	1,715,960.27	Bolivia.....	1	180.00
California.....	29,670	5,194,775.76	Brazil.....	4	744.00
Colorado.....	8,772	1,574,102.51	British East Africa.....	1	144.00
Connecticut.....	10,673	1,527,668.46	British West Indies.....	3	402.00
Delaware.....	2,497	441,179.99	Bulgaria.....	1	144.00
District of Columbia.....	5,046	1,435,924.96	Canada.....	2,749	487,754.08
Florida.....	5,121	894,152.21	Cape de Verde Islands.....	1	96.00
Georgia.....	3,259	527,263.24	Chile.....	12	2,128.92
Idaho.....	2,375	447,103.30	China.....	16	2,648.00
Illinois.....	59,353	10,559,758.90	Comoro Islands.....	1	90.00
Indiana.....	52,413	10,015,321.80	Costa Rica.....	4	618.00
Iowa.....	30,205	5,463,051.05	Cuba.....	62	10,999.42
Kansas.....	33,241	5,638,099.29	Danish West Indies.....	2	288.00
Kentucky.....	22,777	4,022,588.45	Denmark.....	49	8,696.09
Louisiana.....	6,191	973,892.01	Dominican Republic.....	2	288.00
Maine.....	15,142	2,804,068.03	Dutch West Indies.....	6	900.00
Maryland.....	11,735	2,081,560.11	England.....	477	84,624.57
Massachusetts.....	36,121	6,094,662.53	Egypt.....	2	234.00
Michigan.....	36,226	6,590,667.90	Fiji Islands.....	1	120.00
Minnesota.....	13,349	2,325,040.81	France.....	74	13,128.34
Mississippi.....	4,403	727,552.02	Germany.....	522	92,608.02
Missouri.....	42,786	7,645,626.01	Greece.....	8	1,755.55
Montana.....	2,460	411,694.72	Guatemala.....	3	366.00
Nebraska.....	14,090	2,524,192.44	Haiti.....	1	216.40
Nevada.....	405	65,003.28	Honduras.....	2	324.00
New Hampshire.....	6,820	1,282,107.64	Hongkong.....	3	625.00
New Jersey.....	19,539	3,307,706.49	India.....	16	2,838.56
New Mexico.....	1,714	313,100.07	Ireland.....	453	80,366.73
New York.....	72,443	12,708,724.41	Isle of Man.....	2	378.00
North Carolina.....	3,564	629,741.43	Isle of Pines.....	2	432.00
North Dakota.....	1,696	309,986.70	Italy.....	60	10,644.60
Ohio.....	82,895	15,080,951.76	Jamaica.....	7	1,332.00
Oklahoma.....	11,597	2,072,265.44	Japan.....	34	6,031.74
Oregon.....	8,187	1,346,558.46	Korea.....	1	180.00
Pennsylvania.....	82,300	14,292,762.69	Liberia.....	7	916.00
Rhode Island.....	4,739	803,094.77	Madagascar.....	1	276.00
South Carolina.....	1,805	285,004.28	Malta.....	2	180.00
South Dakota.....	4,856	882,568.71	Mexico.....	186	32,998.26
Tennessee.....	16,613	3,226,403.16	Netherlands.....	10	1,510.67
Texas.....	8,755	1,356,249.45	Newfoundland.....	4	612.00
Utah.....	1,053	183,669.41	New Zealand.....	15	2,670.00
Vermont.....	6,870	1,364,726.97	Nicaragua.....	2	255.50
Virginia.....	8,095	1,435,649.79	Norway.....	76	13,520.50
Washington.....	10,752	1,817,748.90	Panama and Canal Zone.....	40	6,768.66
West Virginia.....	11,188	1,983,371.53	Paraguay.....	1	240.00
Wisconsin.....	21,920	4,105,528.10	Peru.....	13	2,288.30
Wyoming.....	932	161,726.43	Portugal.....	3	641.40
Total.....	854,622	151,985,425.89	Russia.....	18	3,176.40
INSULAR POSSESSIONS.			Salvador.....	1	144.00
Guam.....	3	627.72	Samoa.....	1	96.00
Hawaii.....	82	13,798.80	Scotland.....	85	15,079.85
Philippines.....	81	12,210.92	Seychelles Islands.....	1	144.00
Porto Rico.....	41	6,178.00	Siam.....	1	108.00
Total.....	207	32,815.44	South Africa.....	10	1,780.00
FOREIGN COUNTRIES.			Spain.....	3	398.80
Algeria.....	1	108.00	St. Helena.....	1	144.00
Argentina.....	15	2,661.15	Sudan.....	1	204.00
Australia.....	101	17,918.43	Sweden.....	80	14,192.32
Austria-Hungary.....	37	6,564.17	Switzerland.....	70	12,418.70
Azores.....	6	852.90	Tasmania.....	2	288.00
Bahamas.....	3	642.00	Tonga Islands.....	1	180.00
Barbados.....	2	255.27	Turkey.....	20	3,548.13
Belgium.....	24	4,257.84	Uruguay.....	3	883.00
			Venezuela.....	1	144.00
			Wales.....	30	5,322.60
			Total.....	5,465	967,863.89

EXHIBIT 6.—Number of pensioners in each State and Territory, each insular possession, and each foreign country on the rolls June 30, 1912—Continued.

SUMMARY.

	Pensioners.	Payments.
Pensioners residing in States and Territories and payments to them.....	854,622	\$151,985,425.89
Pensioners residing in insular possessions and payments to them.....	207	32,815.44
Pensioners residing in foreign countries and payments to them.....	5,465	967,863.89
Total.....	860,294	152,986,105.22
Payments by Treasury Department (Treasury settlements).....		323.50
Total payments on account of Army and Navy pensions for the fiscal year.....		152,986,433.72

EXHIBIT 7.—Statement showing, by classes, the different monthly rates paid to pensioners under the general pension laws and the number at each rate on the roll June 30, 1912.

Rate.	Regular estab- lishment.		Civil War.							War with Spain.	
			Act of May 11, 1912.	Act of Feb. 6, 1907.	General law.		Act of June 27, 1890.		Act of Apr. 19, 1908.		
	Inva- lids.	Wid- ows, etc.			Inva- lids.	Wid- ows, etc.	Inva- lids.	Min- ors, etc.	Wid- ows.	Inva- lids.	Wid- ows, etc.
\$2.00	2										
3.00	2										
4.00	3										
5.00	8										
6.00	3,939				439		599			10,105	
6.25										5	
7.50	12				8					36	
8.00	2,027				372	4	1,049	31		4,223	
8.50	1				7					40	
9.00					4						
9.50	3				1						
10.00	1,443				366		1,040			2,713	
10.50	3										
11.00	3				1						
11.25					12					24	
11.50	1										
12.00	1,609	3,188		149,661	7,941	57,914	44,509	4,448	232,947	2,280	4,568
12.25					6						
12.50	9				7					11	
12.75					35					43	
13.00	4		113		32						
13.37½	1				1						
13.50	1		219	1	3						
13.68	1										
14.00	633		168	3	6,720	1				829	
14.50			122								
14.75					1						
15.00	40	58	391	112,171	555	1,145				91	30
15.25					1						
15.50	1		593		2					1	
15.84	1										
15.98	1									1	
16.75					1						
16.00	118		595		2,121					36	
16.25					1						
16.50	1		499		4						
16.98	1										
16.75					3						
17.00	1,589	118	311		22,488	1,762				1,493	60
17.44½	1										
17.50	12				3						
17.86	1										
18.00	17		1,150	1	181						
18.18	1										
18.50	2				1						
18.75					16					6	
19.00	2		1,800		2						
19.18	2										
19.25	1										
19.50	2				2						
19.68	1										
19.75							1				
19.84½	1										
20.00	73	189	445	71,705	1,894	1,640				109	76
20.36	1										

EXHIBIT 7.—Statement showing, by classes, the different monthly rates paid to pensioners under the general pension laws and the number at each rate on the roll June 30, 1912—Continued.

Rate.	Regular establishment.		Civil War.							War with Spain.	
			Act of May 11, 1912.	Act of Feb. 6, 1907.	General law.		Act of June 27, 1900.		Act of Apr. 19, 1908.		
	Inva-lids.	Wid-ows, etc.			Inva-lids.	Wid-ows, etc.	Inva-lids.	Min-ors, etc.	Wid-ows.	Inva-lids.	Wid-ows, etc.
\$20.50	5										
20.68	3										
21.00			129	1	1						
21.18										1	
21.25	16				2						
21.50	1		419		1						
21.68	1										
22.00	58				1,352					50	
22.50	2		307	1	17		1			3	
22.68	2										
22.94½	2										
23.00	2		310	1							
23.14½	1										
23.25					2						
23.50	1										
23.86	1										
24.00	929		1,265	1	21,884		1			560	
24.18	2										
24.50					1						
25.00	75	134	2,250	4	1,201	382				29	35
25.25					1						
25.50	3			1							
25.69½	1										
25.75	1										
26.00	2			1						1	
26.36	1										
26.68	1										
26.69½	1										
26.75					1						
26.99½	2										
27.00	28		241	1	677		1			15	
27.36	2										
27.50	5				2					1	
28.00	2										
28.09	1										
28.25	1										
28.64½	1										
28.68	1										
29.00										1	
29.18	2									1	
29.36	1										
29.50				1							
29.68	1										
30.00	779	239	1,917	1	11,872	291				420	24
30.50	2			2							
30.68	1										
31.00	1										
31.18	1										
31.25	1				7						
31.50	1										
32.00	1			1							
32.18										1	
32.36	1										
32.50	2			2							
33.00	1			2							
33.50	1										
34.00	1			2							
34.18	1										
34.25	2										
34.44½	1										
34.50	2										
34.86	1										
35.00				1							
35.50	2			1							
35.68	3										
36.00	7			2	28					1	
36.18	2										
36.34½	1										
36.50	2										
36.59½	1										
36.64½	1										
36.86	1										
37.00	2			1							
37.18										1	

EXHIBIT 7.—Statement showing, by classes, the different monthly rates paid to pensioners under the general pension laws and the number at each rate on the roll June 30, 1912—Continued.

Rate.	Regular establishment.		Civil War.							War with Spain.	
			Act of May 11, 1912.	Act of Feb. 6, 1907.	General law.		Act of June 27, 1890.		Act of Apr. 19, 1908.		
	Inva- lids.	Wid- ows, etc.			Inva- lids.	Wid- ows, etc.	Inva- lids.	Min- ors, etc.	Wid- ows.	Inva- lids.	Wid- ows, etc.
\$37.19½	1										
37.35	1										
37.50	7			3						1	
37.65	2										
37.85	1										
38.00	2										
38.25				1							
38.35	1										
39.00				1							
39.99½	1										
40.00	160				2,218					94	
40.54½	1										
40.68	1										
40.74½	1										
41.00	2										
41.65	2									1	
41.78	1										
42.09½	1										
42.50			1								
42.65	1										
43.50	1			1							
44.00	2										
44.35	1										
44.59	1										
44.85	1										
45.00					2						
45.50	1										
46.00	95				1,192					61	
47.00	2										
47.25	1										
47.50				1							
48.00	1				1						
48.50	1										
48.78	1										
49.50				1							
50.00	84			1	1,033					66	
50.35										1	
50.50			1								
52.00	3										
53.50				1							
53.64	1										
54.00	1										
55.00	41				1,318					33	
55.35	1										
57.50	2										
58.00	1										
58.00	1				2						
60.00	1				2						
65.35										1	
62.35	1										
62.85	1										
63.00	1										
71.64½	1										
72.00	75				565					42	
72.65	1										
80.00	2										
82.50	1										
85.00	1										
100.00	36				431					13	
100.18	1										
Total...	14,164	3,926	13,246	333,579	87,044	63,148	47,201	4,479	232,947	23,424	4,708

In addition to the above, there were at the close of the year:

Army nurses—279, at \$12.

Widows of the War of 1812: 224, at \$12.

War with Mexico:

Survivors—13, at \$12; 2, at \$15; 1,059, at \$20; 97, at \$30; and 1, at \$60.

Widows—5,232, at \$12.

Indian wars:

Survivors—937, at \$8.

Widows—2,365, at \$12.

EXHIBIT 8.—Statement showing, by classes, the different monthly rates paid to pensioner under special acts of Congress, and the number at each rate on the roll June 30, 1912.

Rate.	Regular establishment.		Civil War.			War with Spain.		War of 1812.	War with Mexico.		Indian wars.	
	Inva. lds.	Wid-ows, etc.	Inva. lds.	Nurses.	Wid-ows, etc.	Inva. lds.	Wid-ows, etc.	Wid-ows.	Survivors.	Wid-ows.	Survivors.	Wid-ows.
\$6.00	5		6			9	1					
8.00	11		25		12	31	1			1	26	
10.00	8		7		2	25						
12.00	62	83	332	60	1,068	151	112	1	13	225	8	72
12.50						1						
14.00	4		18		4	4						
15.00	4	3	21		83	17	4			1		
16.00	10	1	26		188	7		1	2	13	235	
17.00	8	5	77		122	21	6					
17.50			1									
18.00	1	4	8		44	3	1			1		
20.00	14	23	559	5	771	36	14	1	106	1	9	1
22.00			1		5	2						
24.00	29	2	7,770	4	157	86		11				1
25.00		39	26	5	131	2	25		1	1		
27.00			1		1							
28.00	1											
30.00	25	76	5,971		189	52	19		19	7		
32.00			1		1							
33.00			1									
35.00		30			11		9					
36.00	1		505		3							
40.00	8	67	478		23	2	11			1		
45.00	1	1	23		1							
46.00	3		17			3						
50.00	11	71	237		53	12	11					
55.00			21			1						
60.00			9									
65.00			4									
67.00			1									
72.00	2		24			1						
75.00		2	2		5		1					
100.00	1	4	17		7	1						
125.00		1										
166.66					2							
208.33		1										
416.66					1							
Total	209	414	16,193	83	3,799	417	216	14	141	251	273	74

EXHIBIT 9.—Statement showing the number of pensioners in each class under the general pension laws and "special acts" of Congress, together with the annual value of each on the roll at the close of the fiscal year ended June 30, 1912.

Classes.	General laws.		Special acts.	
	Number.	Annual value.	Number.	Annual value.
Invalids, regular establishment	14,164	\$2,367,809.46	209	\$53,508.00
Widows, etc., regular establishment	3,926	681,576.00	414	159,352.00
Survivors, act May 11, 1912	13,246	3,445,280.00		
Survivors, act Feb. 6, 1907	333,579	58,846,851.00		
Invalids, general law	87,044	23,742,331.50	16,193	5,291,466.00
Nurses	279	40,176.00	83	13,788.00
Widows, etc., general law	63,148	9,557,700.00	3,799	783,696.00
Invalids, act June 27, 1890	47,201	6,679,767.00		
Minors, etc., act June 27, 1890	4,479	803,184.00		
Widows, act Apr. 19, 1908	232,947	33,721,656.00		
Invalids, War with Spain	23,424	2,832,378.44	417	89,922.00
Widows, etc., War with Spain	4,793	739,472.00	216	54,732.00
Widows, War of 1812	224	32,256.00	14	3,744.00
Survivors, War with Mexico	1,172	292,032.00	141	34,836.00
Widows, War with Mexico	5,282	760,608.00	251	38,808.00
Survivors, Indian wars	937	89,952.00	273	40,824.00
Widows, Indian wars	2,365	340,560.00	74	10,896.00
Total	838,210	144,973,569.40	22,084	6,584,572.00
Total number of pensioners			860,294	
Total annual value			\$151,558,141.40	
Average value of each pension:				
All classes			\$176.17	
Regular establishment			\$174.33	
Act May 11, 1912			\$280.09	
Act Feb. 6, 1907			\$176.41	
General law, Civil War			\$221.71	
Act June 27, 1890			\$144.76	
Act Apr. 19, 1908			\$144.76	
War with Spain			\$128.53	
Survivors, Civil War			\$197.06	

EXHIBIT 10.—Certificates issued during the fiscal year ended June 30, 1912.

Classes.	Original.	Increase.	Additional.	Reissue.	Restoration.	Renewal.	Supplemental.	Total.
General law:								
Army—								
Invalids.....	12	4,761		1,265	7	657	23	6,725
Nurses.....		1						1
Widows, etc.....	653	41		348	13	345	11	1,411
Navy—								
Invalids.....		28		36		4		68
Widows, etc.....	3			4		1		8
Old wars—								
Invalids.....		3						3
Widows, etc.....	1					1		2
War with Spain—								
Army—								
Invalids.....	817	1,152		41	17	10		2,037
Widows, etc.....	191			7		5		203
War with Spain—								
Navy—								
Invalids.....	26	21						47
Widows, etc.....	6					1		7
Regular establishment—								
Army—								
Invalids.....	723	673		27	2	4		1,429
Widows, etc.....	228	1		12	1	2		244
Regular establishment—								
Navy—								
Invalids.....	432	156		25	8	26		647
Widows, etc.....	154	2		3			1	160
Act of June 27, 1890:								
Army—								
Invalids.....	127	64	9	54	20	2	59	335
Widows, etc.....	1,064	2		34	16	16	42	1,174
Navy—								
Invalids.....	12	8		3	2		2	27
Widows, etc.....	37						2	39
Act of Feb. 6, 1907:								
Army—Civil War.....	1,174	30,609		11,836	16	134	10	43,779
Navy—Civil War.....	148	1,272		377	1	1	2	1,801
Survivors—Mexican War.....				3				3
Act of Apr. 19, 1908:								
Army widows.....	16,161	1		342	14	6	1	16,525
Navy widows.....	566	1		13				580
Act of May 11, 1912:								
Army—Civil War.....	2			12,383			1	12,386
Navy—Civil War.....				896				896
Survivors—Mexican War.....				118		4		122
War with Mexico, act 1887, etc.:								
Survivors.....		1			1		1	3
Widows.....	146							146
Indian wars:								
Survivors.....	7	20						27
Widows.....	87							87
Total.....	22,777	38,817	9	27,827	118	1,219	155	90,922

Certificates issued each month during year.

July, 1911.....	6,126	February, 1912.....	6,440
August, 1911.....	6,384	March, 1912.....	7,791
September, 1911.....	6,004	April, 1912.....	7,483
October, 1911.....	7,770	May, 1912.....	8,173
November, 1911.....	6,304	June, 1912.....	15,908
December, 1911.....	5,721		
January, 1912.....	6,818	Total.....	90,922

EXHIBIT 11.—*Classification of claims pending June 30, 1912.*

Civil War:

General law—

Original invalid.....	346	
Reissue invalid.....	157	
Increase invalid.....	1,952	
		2,455
Original widows.....	1,357	
Reissue widows.....	129	
Increase widows.....	43	
		1,529
Original minors.....	111	
Reissue minors.....	33	
Increase minors.....	9	
		153
Original dependents.....	31	
		4,168

Act of June 27, 1890—

Original invalid.....	111	
Increase invalid.....	1,755	
		1,866
Original widows.....	381	
Supplemental widows.....	1	
Original minors.....	453	
		835

2,701
645

Act of Mar. 3, 1901—Remarried widows.....

Act of Feb. 6, 1907—

Original.....	1,267	
Reissue.....	768	
Increase.....	4,856	

6,889

Act of Apr. 19, 1908—Original widows.....

Act of May 11, 1912—Survivors.....

6,843
391,642

412,388

Regular establishment—

Original invalid.....	2,160	
Increase invalid.....	5	
		2,165
Original widows.....	128	
Original minors.....	5	
Original dependents.....	122	
		255

2,420

War with Spain:

Original invalid.....	5,730	
Increase invalid.....	282	
		6,012
Original widows.....	541	
Original minors.....	45	
Original dependents.....	164	
		750

6,762

Mexican War:

Survivors (act Jan. 29, 1887).....	4	
Survivors (act Feb. 6, 1907).....	4	
Survivors (act May 11, 1912).....	627	
		635
Widows (act Jan. 29, 1887).....	138	

773

Indian wars (acts July 27, 1892; June 27, 1902; and May 30, 1908):

Survivors.....	11	
Widows.....	98	

109

War of 1812: Original widows.....

Old wars: Increase invalid.....

4
8

Total..... 422,464

REPORT OF THE COMMISSIONER OF PATENTS.

213

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
Washington, D. C., October 25, 1912.

SIR: I have the honor to submit herewith the following report of the business of the United States Patent Office for the fiscal year ended June 30, 1912:

WORK OF THE YEAR.

Applications received during fiscal year ended June 30, 1912.

Applications for patents for inventions.....	69, 236
Applications for patents for designs.....	1, 775
Applications for reissues of patents.....	195
Applications for registration of trade-marks.....	7, 238
Applications for registration of labels.....	941
Applications for registration of prints.....	362
Total applications.....	79, 747
Disclaimers.....	12
Appeals on the merits.....	1, 700
Total applications, disclaimers, and appeals.....	81, 459

Applications for patents for inventions.

Year ended June 30—	Year ended June 30—
1903..... 49, 199	1908..... 58, 527
1904..... 50, 321	1909..... 62, 800
1905..... 52, 323	1910..... 63, 365
1906..... 55, 619	1911..... 65, 154
1907..... 56, 514	1912..... 69, 236

Applications for patents, including reissues, designs, trade-marks, labels, and prints.

Year ended June 30—	Year ended June 30—
1903..... 54, 256	1908..... 68, 441
1904..... 55, 468	1909..... 73, 026
1905..... 66, 228	1910..... 72, 533
1906..... 68, 881	1911..... 74, 677
1907..... 66, 795	1912..... 79, 747

Applications awaiting action.

Applications awaiting action on the part of the office, July 1, 1912..... 21, 059

Applications awaiting action on the part of the office.

Year ended June 30—

1908.....	20,043
1909.....	17,153
1910.....	14,575
1911.....	17,809
1912.....	21,059

Patents withheld and patents expired.

Letters patent withheld for nonpayment of final fees.....	6,970
Letters patent expired.....	19,634
Applications allowed, awaiting payment of final fees.....	14,415

Patents granted and trade-marks, labels, and prints registered.

Class.	1908	1909	1910	1911	1912
Letters patent.....	34,003	34,332	36,287	33,513	34,220
Design patents.....	748	721	629	777	1,148
Reissue patents.....	151	162	142	138	171
Trade-marks.....	6,125	4,547	4,342	3,791	4,635
Labels.....	636	779	176	576	625
Prints.....	279	261	80	181	268
Total.....	41,952	40,772	41,635	38,976	41,067

Receipts from all sources.

Applications, first fees.....	\$1,029,900.00
Designs.....	32,170.00
Reissues.....	5,790.00
Trade-marks.....	71,606.00
Final fees.....	692,530.00
Appeals.....	19,175.00
Disclaimers.....	110.00
Coupons.....	48,453.30
Drawings.....	6,219.13
Recording assignments.....	47,184.98
Official Gazette and other publications.....	19,271.20
Labels.....	4,910.00
Prints.....	1,884.00
Court costs.....	15.00
Copies of patents ¹	49,752.85
Copies of records.....	65,221.94
Total ¹	2,094,193.40
¹ Less refundments on account of caveat fees and unapplied fees received during fiscal year 1910-11.....	133.90
Total receipts.....	2,094,059.50

¹ During the year copies of patents to the value of \$114,808.95 were furnished, \$65,056.10 worth of copies being furnished upon coupons, many of which had been sold in preceding years.

Expenditures.

	Expended.	Estimated liabilities.	Total.
Salaries.....	\$1,305,334.31		\$1,305,334.31
Scientific library.....	843.86	\$1,648.54	2,492.40
Postage on foreign matter.....	733.56		733.56
Stationery.....	10,394.90		10,394.90
Ice.....	574.06		574.06
Telephones.....	942.67		942.67
Washing towels.....	133.23		133.23
Furniture and sundries.....	20,125.53		20,125.53
Law library.....	203.35	261.90	465.25
Photolithographing, paid contractor.....	110,701.69		110,701.69
Photographic printing, paid contractor.....	7,506.54		7,506.54
Printing old specifications, paid Public Printer.....	21,791.77		21,791.77
Printing and binding:			
Official Gazette and indexes.....	150,025.24		150,025.24
Specifications.....	358,718.85		358,718.85
Miscellaneous.....	35,121.70		35,121.70
International Convention for Protection of Industrial Property.....		750.00	750.00
Total.....	2,014,561.17	4,674.84	2,025,912.30

Receipts and expenditures.

Receipts from all sources.....	\$2,094,059.50
Expenditures.....	2,025,912.30
Net surplus.....	68,147.20
Total net surplus to date.....	7,132,072.96

Comparative statement.

June 30—	Receipts.	Expenditures.
1903.....	\$1,591,251.04	\$1,423,094.40
1904.....	1,663,879.99	1,469,124.40
1905.....	1,737,334.44	1,472,467.51
1906.....	1,811,297.84	1,538,149.40
1907.....	1,859,592.89	1,584,489.70
1908.....	1,874,180.75	1,608,292.01
1909.....	1,975,919.97	1,887,443.35
1910.....	2,022,043.26	1,953,549.76
1911.....	1,987,778.58	1,957,001.85
1912.....	2,094,059.50	2,025,912.30

As specified in the foregoing statement, there were received in the last fiscal year 69,236 applications for mechanical patents, 1,775 applications for designs, 195 applications for reissues, 7,238 applications for trade-marks, 941 applications for labels, and 362 applications for prints.

There were 35,539 patents granted, including reissues and designs, and 4,635 trade-marks, 625 labels, and 268 prints were registered.

The number of patents that expired was 19,634. The number of allowed applications which were by operation of law forfeited for nonpayment of the final fees was 6,970. The total receipts of the office were \$2,094,059.50. The total expenditures were \$2,025,912.30, and the net surplus of receipts over expenditures was \$68,147.20.

The grand total of net surplus of receipts over all expenditures is now \$7,132,072.96.

It will be noted from the foregoing tables that the volume of business has materially increased during the last fiscal year. The total number of applications for patents for inventions, for designs, for reissue of patents, registration of trade-marks, registration of labels, and registration of prints, disclaimers to patents, and appeals on the merits is 81,459. The total of all applications for the fiscal year immediately previous was 76,383 for the same period, which shows an increase of 5,076 applications received.

The number of applications for mechanical patents shows an increase of 4,082 over the previous fiscal year, or 6.26 per cent, an increase for the 10 years since 1903 of 40.72 per cent.

It will also be observed that the receipts of the office from fees for applications have been greater than preceding years, which clearly indicates the very marked prosperity of the country, as the activities in inventions and all things pertaining to them is a sure barometer of the financial condition of the country.

The condition of this office is fairly good considering the great handicap represented by the insufficient force and inadequate salaries and the want of sufficient room and proper equipment with which the work of the office can be carried on.

The number of appeals has also necessarily increased, consequent upon the increased volume of work. The number of cases appealed and heard and disposed of by the three appellate tribunals of the office and the Court of Appeals of the District of Columbia in patent cases is shown in the following table:

Appellate work.

Number of interferences declared	1,642
Number of interferences disposed of before final hearing.....	1,241
Number of interferences heard.....	239
Number of interferences disposed of.....	284
Number of interferences awaiting decision.....	54
Appeals to examiners in chief in interference cases.....	176
Ex parte appeals to examiners in chief.....	933
Total.....	1,109
Number of appeals in interference cases disposed of.....	143
Number of ex parte appeals disposed of.....	694
Total.....	837
Interference cases awaiting action.....	111
Ex parte cases awaiting action.....	532
Total.....	643

Appeals to commissioner in interference cases.....	100
Appeals to commissioner in opposition cases.....	13
Appeals to commissioner in cancellation cases.....	4
Ex parte appeals to commissioner.....	173
Interlocutory appeals to commissioner.....	245
Ex parte appeals in trade-mark cases.....	68
Total.....	603
Petitions to commissioner.....	2,600
Total.....	3,203
Number of cases disposed of by commissioner:	
Appeals in interference cases.....	110
Appeals in opposition cases.....	13
Appeals in cancellation cases.....	1
Ex parte appeals.....	174
Interlocutory appeals.....	243
Ex parte appeals in trade-mark cases.....	55
Total.....	596
Petitions to commissioner.....	2,599
Total.....	3,195
Appeals to Court of Appeals, District of Columbia:	
Ex parte cases.....	34
Interference cases.....	55
Opposition cases.....	4
Cancellation cases.....	2
Total.....	95

EMPLOYEES AND SALARIES.

Congress during the last year has failed to make any provisions for increase in salaries of employees and force, and I therefore take the liberty of reiterating the recommendations contained in my previous reports, with reference to the necessity for a further recognition of the high grade of work done by the examining corps of the Patent Office. While I understand that it was the rule during the past year that no increases in salaries should be granted, I take the liberty of pointing out the exceptional conditions that prevail in this office, not only by reason of the fact that the office is self-supporting, but chiefly because of the fact that the trained examiners are in great demand with prominent firms and business trusts, and it is the rule, rather than the exception, that when a man is sufficiently experienced and trained to become of value to the Patent Office he receives an offer of higher compensation from the outside. This exodus of a trained class of men necessarily has a tendency to reduce the average of efficiency of the corps, so that it is a difficult task to maintain a proper standard for the expeditious and successful conduct of the public business. It may be said in passing that this

situation is not only demoralizing to the office, but is also a handicap to the commercial interests of the country, which are entitled to the best possible service from the Patent Office. These examiners who separate themselves from the service take with them a knowledge of all the secret inventions with which they have been associated in their respective duties, and while I do not think this knowledge is imparted to the concerns with whom they go, yet it is much better to have everything connected with the Patent Office above the possibility of reproach.

For this reason, among others, therefore, it is doubly important that the proposed increase of salaries should be granted to retain these men in the service.

I therefore earnestly request that you approve my recommendations made in the estimates to Congress, for increased salaries, and also the needful increase in the number of employees.

COLLECTIVE TRADE-MARKS.

In the International Convention for the Protection of Industrial Property, signed at Washington, June 2, 1911, which under the terms of the convention is to become effective April 1, 1913, by the countries which have ratified the same, it having been ratified by the United States, there was contained the following provision:

ARTICLE 7 $\frac{1}{2}$. The contracting countries agree to admit for filing and to protect marks belonging to associations, the existence of which is not contrary to the law of the country of origin, even if these associations do not possess an industrial or commercial establishment.

Each country shall be the judge of the special conditions under which an association may be admitted to have the marks protected.

Pursuant to this provision of the convention the President, on January 13, 1912, directed that a measure be prepared for transmission to Congress which would be adapted to fulfill the terms of this article of the convention of Washington. This was done and sent forward to the President through your office. On February 2, 1912, the President in a message to Congress directed the attention of Congress to the necessity for this legislation, and it is believed that a copy of that proposed bill prepared by me was transmitted with that message to Congress by the President.

The bill as prepared provided that the act approved February 20, 1905, as amended, be further amended by the addition to section 1 thereof the following paragraph:

Where any association or any union of workmen undertakes the examination of any goods in respect of origin, material, mode of manufacture, quality, accuracy, or other characteristic and service and certifies the result of such examination by a mark used upon or in connection with such goods in commerce with foreign nations or among the several States of the United States or with Indian tribes, such association or union of workmen may register the mark as a trade-mark in respect to such goods

upon compliance with the provisions of the act of February 20, 1905, as amended, whether or not such association or union of workmen be a trading association or trader or possessed of a good will in connection with such examination and certifying. When so registered such mark shall be deemed in all respects to be a registered trade-mark, and such association or union of workmen the proprietor thereof: *Provided, however*, Such trade-mark shall not be transferable or assignable.

So far as I am aware this bill has never been introduced in Congress, although the necessity for the same is apparent. Laws for the enforcement of collective marks are in force in European countries, and the draft of the bill which was submitted to the President conforms substantially in terms to the provisions of law upon this subject found in the British Trade Mark Act of 1905.

GAINS IN EFFICIENCY AND ECONOMY.

The affairs of the office have been conducted with the most rigid economy. At the recent session of Congress I recommended that the library edition of specifications and drawings be abolished, as that publication is no longer desirable or useful. Congress repealed the law and this has resulted in a saving annually of about \$65,000.

THE SCIENTIFIC LIBRARY.

Since January 10, 1912, 3,000 volumes in the Scientific Library have been sent to the Government Printing Office bindery. Previously the yearly average did not reach 1,000 volumes. There are now in the library more than 6,000 volumes to be bound, rebound, or repaired, at a probable cost of not less than \$20,000, and, I believe, if progress in this work be not interrupted, it can be finished in two years.

The library appropriation of \$2,500, of which nearly \$1,000 must be used to pay transportation of United States patents to foreign countries, is inadequate to pay for current subscriptions to periodicals and new books, and should be large enough to permit purchase of every valuable addition to scientific and technical literature germane to the purposes of the library.

Of greatest importance to all concerned is the scientific index of periodicals, which, begun more than 20 years ago, now requires careful revision in order to preserve its effectual use and meet the demands of progress in all the arts, notably electricity and other classes prominent in the world of invention to-day. The present unsatisfactory state of this index may well be expected, when no time has been given to revision and when those doing the work are not fully skilled in all the arts represented, although their training through experience has done much to qualify them for this line of work.

A great saving of time has been effected by bringing to the library the triplicate set of French patents and arranging them in order of the French patent classification, which, though not perfect, is far better than a numerical arrangement for searches. These French triplicates have been stored in the galleries since 1903. The German triplicates still remain in these galleries, and should also be brought to the library for classification. When the new book stacks are placed I shall make every effort to have these German patents classified as the French patents now are. About 50,000 German patents, the first of the issue, are missing and can be obtained from the German patent office at a cost of about \$1,500. This classification will save time, labor, and wear and tear of expensively bound volumes, as it is certain that did we not have the Abridgements of British Patents, many volumes of inestimable value would have been badly damaged by constant use. All searchers agree that the classified volumes are much to be preferred to those arranged numerically or chronologically.

The force of the library, composed in greater part of clerks above the average in education and mental ability, has been working under most discouraging conditions, and has welcomed such change as has been lately effected in the library conditions.

TRAVELING EXPENSE FUND.

The custom of allowing members of the examining corps to visit points outside of the District of Columbia, at the expense of applicants and attorneys, in order to acquaint them with the working of devices represented by pending applications for patent, has been discontinued, and under an appropriation made during the present session of Congress entitled "For investigating the question of public use," the expenses of these trips are now paid by the Government, as recommended by me at the last session.

This change is one that I have been for some time trying to effect, and it is gratifying to me to report that it has been accomplished. It is obvious that under the present arrangement the opportunity for criticism of this custom, which obtained years ago, has been removed. It may be stated, however, that in all instances of this kind the policy of the office has been to grant authority for these inspections only where the good of the service has apparently demanded them. The renewal of this appropriation for the ensuing fiscal year, and for succeeding years, is recommended.

INDEPENDENT BUREAU DESIRABLE.

I have long been of the opinion that since the opinion of the Supreme Court in the case of *Butterworth v. United States ex rel. Hoe and others* (112 U. S., 50), which made the decision of the commissioner final within the office, thus doing away with appeals

to the Secretary of the Interior, the connection of the Patent Office with the department is so slight that it would seem that its separation and establishment as an independent bureau is eminently desirable. Such a step would not only place the Patent Office upon a more stable footing with regard to the exercise of the powers of the commissioner invested in him by law, but would relieve the department of the physical burden of caring for and appropriating for the bureau.

I believe that the establishment of the Patent Office as an independent bureau would be a step in the direction of progress and that it is also in the interest of efficiency and economy. Its duties as an office are purely judicial in character with such incidental clerical work as is necessary to carry them out; it requires in its employees special training along scientific and legal lines, and such employees are difficult to obtain and to retain in service, except at salaries higher than those paid to the other employees of the department; and the Patent Office has always suffered by reason of the failure of Congress to make the provision necessary. If good results are to be obtained, everything possible should be done to insure the independence, efficiency, and permanence of tenure of the entire force of the Patent Office. The Patent Office has nothing in common with the other bureaus of the Interior Department or of any other department. There is no appeal to the Secretary of the Interior on any question relating to the grant of a patent, and all appointments to positions in the Patent Office, except such as are Presidential, are made upon the nomination of the Commissioner of Patents, approved by the Secretary. The desirability of this change in the status of the Patent Office is recognized and provided for in a bill introduced by Mr. Oldfield, chairman of the House Committee on Patents of the House of Representatives, on April 16, 1912, and known as H. R. 23417. The subject was also ably discussed by the late Senator O. H. Platt, of Connecticut, one of the best posted men on the character of the work of the Patent Office and its needs who ever sat in either House of Congress, in a speech delivered in the Senate on March 31, 1884, and from which I quote the following extracts:

I say that the Patent Office should be made an independent department, not only because of the vast importance of the interests which it must care for, but because of the treatment which it has received and must continue to receive as long as it remains a subordinate branch of the Interior Department.

* * * * *

What should be the qualifications of the head of the Patent Office? He should combine an accurate and almost universal knowledge of mechanical principles with a thorough knowledge of patent law and with rare executive and administrative ability. He should be preeminently distinguished for these qualities. His position should be one of entire independence. It is more judicial than executive. His duties are more like those of a judge of a court than an executive officer; they are purely judicial

and ministerial. The office should be permanent and it should be nonpolitical, by which I mean it should have no political significance.

* * * * *

Every year's experience adds greatly to the capacity and ability of the Commissioner of Patents. In a word, the Patent Office needs and demands better administration, and it never will have it, as a rule, until it shall be made a separate department. It must be held in entirely different estimation by Congress and by public sentiment before it will be what it ought to be. The way to secure this estimation by Congress, the way to secure for it what it wants and what it needs and what it must have if it is properly to discharge the high functions which devolve upon it, is to separate it entirely from any supervision by the Secretary of Interior, to make it independent and dignified.

The Interstate Commerce Commission is pointed to as an independent bureau which is doing excellent work for the commercial progress of the nation, and the Library of Congress is another example of a bureau working independently which is successfully organized and directed. In my opinion the judicial functions of the Patent Office should be as carefully safeguarded as those of the courts.

NEED FOR BETTER QUARTERS.

The mention of the physical needs of the Patent Office leads me again to the subject of new quarters. I have frequently called attention to the necessity for relief along these lines. As far back as April, 1909, the late Senator Daniel, of Virginia, introduced a bill which contemplated the condemnation and purchase of sufficient ground opposite the Capitol Grounds and immediately north of the Library of Congress, upon which to erect a building suitable to house the working force of the Patent Office, and in which might be preserved for all time the priceless archives which form a record of American invention. I desire to ask the introduction of a similar bill immediately upon the convening of Congress, and in view of the fact that my former recommendations in my last annual report were approved by you and supported in your report to the President, I have no hesitancy at this time in asking that you renew your approval and support of this proposition.

It is only necessary to investigate the present crowded and unsatisfactory condition of the Patent Office to realize that this is a grave necessity and that every year's delay in the proper housing of the office means additional dissatisfaction and overcrowding. I have heretofore indicated the fact that the Patent Office has earned the money that might be thus appropriated, and the fact that these requests have been hitherto ignored by Congress has resulted in a condition that is little better than a disgrace to the nation. The inventors and manufacturers pay in fees for the work performed for them the total expenses of the office, and each year there is a handsome surplus, and yet the work is done in insanitary and crowded

quarters, which have long since become obsolete. It is a fact that the office lacks modern equipment and space by which the best service can be given. Furthermore, the loss of the valuable records of patents would be a staggering blow to the commercial interests of the country and result in commercial chaos, in which no one could support his title of ownership of valuable patents, and piracy would be possible without fear of punishment. These records are in constant danger of destruction by fire in their present surroundings, and subject to the ravages of time and other destructive elements.

The suggestion made in my last annual report that modern quarters be leased for the Patent Office, to be used during the construction of the proposed new building, is urgently renewed. By this means the present building can be renovated and reconstructed simultaneously with the construction of the new building, and will then be available for the other bureaus of your department, which, relieved from the presence of the Patent Office, would not have to occupy rented quarters, as is now the case.

INVESTIGATION BY PRESIDENT'S COMMISSION ON ECONOMY AND EFFICIENCY.

In view of the fact that the Committee on Patents at the last session of Congress unanimously reported out House Joint resolution 337, looking to a thorough investigation of the Patent Office, as to its needs and conditions, and requesting the President to instruct his Commission on Economy and Efficiency to perform the investigation called for by the resolution, I do not deem it necessary or proper for me to renew at any great length previous recommendations made and which have been in my reports to you and to Congress and orally before the committees thereof. The commission is now actively engaged in the investigation of all the branches of the office, and inquiring into and considering all recommendations previously made by me in my reports as noted above, and will make its report to the Congress on December 10, 1912.

Respectfully submitted.

EDWARD B. MOORE,
Commissioner of Patents.

STATEMENT OF THE COMMISSIONER OF EDUCATION.

227

STATEMENT OF THE COMMISSIONER OF EDUCATION.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, September 3, 1912.

SIR: I have the honor to submit the following statement of the operations of this office for the fiscal year ended June 30, 1912.

DIVISION OF HIGHER EDUCATION.

The work of this division for the year has proceeded along four lines—routine statistical work, the preparation and publication of special bulletins or circulars, the supervision of the finances and administration of the land-grant colleges so far as these are related to Federal funds, and the field work of the two specialists in the division.

The results of the collection of statistics and other data relating to colleges, universities, technological schools, professional schools, and normal schools are presented in the annual report of the Commissioner of Education. There have been prepared, also, the annual bulletin giving the segregated statistics of State universities and other institutions of higher education partially supported by the State, and a pamphlet giving the "Federal laws, regulations, and rulings affecting the land-grant colleges of agriculture and mechanic arts." A tentative, proof-sheet circular of classification of universities and colleges with reference to the bachelors' degrees was also issued in a limited edition. The investigations made in preparation for the latter circular have continued through the year incidentally with other work, in anticipation of the issue of a revised edition as originally contemplated.

The two specialists of the division have carried on without interruption their inspection of the finances, organization, and administration of institutions receiving Federal aid under the acts of Congress of 1862, 1890, and 1907. Forty institutions were visited, several of them for the first time. Irregularities in the application of these Federal grants have been discovered and steps taken for remedying them promptly, as, for example, in the case of five States which are receiving on their investment of funds arising from the land grant

less than the 5 per cent required by the act of July 2, 1862. The results of this close inspection demonstrate anew the wisdom of the policy of active personal supervision. The reports required to be made by institutions receiving Federal aid under the acts of Congress of August 30, 1890, and March 4, 1907, were duly received and examined by this office and it was found that, with the exception of a single State, the expenditures had been made for the purposes specified in the acts.

The field work of the specialist in higher education has expanded in a gratifying manner. By the terms of an agreement made in November, 1910, with the National Association of State Universities, he has this year devoted a large part of his time to a study of the State university problem, inspecting the equipment, organization, and work of 16 State universities, and preparing a report upon each. Along with these visits to State-supported universities, nine privately endowed colleges and universities, in every case by their own request, have been examined by the specialist with a view to making helpful suggestions to them as well as bettering his knowledge of their aims and efficiency. The State of Oregon through its department of public instruction, in accordance with an act of the legislature in 1911, asked and received the services of the specialist as an expert in standardizing the colleges and universities of that State. The State of Virginia, after a similar investigation at the request of the Virginia Education Commission, received a detailed report upon the five institutions of higher education receiving financial support from that Commonwealth. A large extension of these opportunities to serve the States and their institutions in this advisory capacity may be expected.

DIVISION OF SCHOOL ADMINISTRATION.

During the year the division prepared four chapters and a portion of a fifth chapter in the Commissioner's annual report; 19 legislative circulars, one each week, were issued during the winter months, giving an account of the educational matters passed upon by the various State legislatures then in session; also 7 city circulars treating various subjects of immediate interest to city school administrators. The subjects of these circulars are: "Comparison of the educational provisions of the present and of the proposed 'Gaynor' charter of New York City;" "Vacation schools—regular school work;" "Industrial education in Cincinnati;" "Changes made in the public-school systems of certain cities;" "Digest of State laws, school board regulations, and judicial decisions relating to high school fraternities;" "Abstracts from New York City report, 1911;" "Dental inspection and instruction in oral hygiene." Three bulletins were completed, one of which deals with city school systems, one with State school systems, and another with both State and city

systems. The subjects of these bulletins are as follows: "Teachers' certificates issued under general State laws and regulations;" "A study of expenses of city school systems;" "A comparison of urban and rural school statistics."

The division continued its cooperation with various national and State agencies for the promotion of educational administration. Together with the Committee on Uniform Records and Reports of the Department of Superintendence of the National Education Association, the bureau has been able to initiate an important and far-reaching movement in the keeping by the several school systems in the United States of uniform school records, fiscal and attendance, and in the uniform reporting of the same. The final report on this subject was adopted by the Department of Superintendence in February, 1912, and it now remains for the bureau to promote the general adoption of the forms as drafted. The division has taken an active part also in securing wider recognition among the various States of the higher classes of teachers' certificates. This work, which is carried on in cooperation with the conference of chief State education officers, is not yet completed.

The division has also kept in close touch with the work of the Committee of the National Education Association on Teachers' Salaries and Cost of Living, and has prepared considerable material for its use. Close relations with the Department of Superintendence of the National Education Association have made it possible for the division to serve more adequately the needs of the members of the association.

The number of city school reports, rules and regulations, directories, and other city publications in the office files is greater than ever before. A card catalogue of all of them has been made, and approximately 125 of the more important and representative city reports have been carefully indexed upon cards classified by subjects for use in answering inquiries and in the preparation of publications of the bureau. The complete file of State reports, bulletins, and directories, of school and session laws, and of such codes as are not in the Land Office library, which is easy of access, is also worthy of note. The division is more fully prepared than ever before, as far as its equipment is concerned, to carry on all forms of investigation which involve State, city, or rural public school administration.

DIVISION OF SCHOOL HYGIENE AND SANITATION.

This division was created by an order of October 19, 1911. The purpose set forth in the establishment of the division included the following:

1. To furnish to all who seek it information regarding the sanitary construction of school buildings.

2. To bring together at the bureau information relating to school hygiene and sanitation and to render this information accessible to school authorities and all others interested.

3. To gather and prepare for publication information concerning the hygienic condition of school buildings and grounds throughout the country.

4. To conduct all correspondence referred to it wherein advice and information are sought on matters of school hygiene and school sanitation.

5. To prepare bulletins on such special topics as the commissioner may from time to time direct.

6. To direct such cooperative investigations as shall be made in connection with the bureau on matters relating to the hygiene of school children.

7. To compile and send out bibliographies on special topics in school hygiene, school sanitation, and medical inspection.

8. To assist in any other work connected with the bureau which the commissioner may see fit to assign to the division.

The work undertaken and thus far accomplished by this division is as follows:

1. It has answered all correspondence referred to the bureau relative to the construction of school buildings, both public and private, and its help has been sought by school boards and school officers in general from many parts of the country. Accordingly, aid has been given by advising in the planning, location, and construction of school buildings of all kinds.

2. Extensive annotated bibliographies on the following topics have been compiled and sent out on the request of teachers, school officers, and others interested:

The hygiene of child development.

Medical inspection of school children.

Medical inspection methods in the United States.

Medical inspection records.

Open-air schools and classes: Costs, plans, and results.

Playgrounds: Selected list of references.

Rural school grounds.

Sanitary science and public health education.

School gardens: United States.

Schoolhouses.

School hygiene.

The school janitor.

Schoolrooms: Color schemes.

Sex instruction of school children.

3. A comprehensive plan has been undertaken to prepare an annotated card index of all the most important literature available in the library of the bureau and elsewhere bearing on questions of school

hygiene and school sanitation and other topics having to do directly with the health of school children and with school architecture.

4. The division has undertaken to prepare, in connection with the Fifteenth International Congress on Hygiene and Demography, to be held in Washington the latter part of September, 1912, an exhibition on school hygiene. This work has required much labor and extensive correspondence, but a creditable exhibition is now assured.

5. An intensive survey of the hygienic condition of rural school-houses and premises in two selected counties in each of 19 States has been completed. This survey was made with the cooperation of the State superintendents, the county superintendents, and the rural teachers. More than 3,300 personal letters and inquiries were sent out, and the returns from these have been collated and interpreted. The results of this study will be published later in the form of a bulletin.

6. A plan for cooperation has been effected with the various State boards of health, so that the bureau receives all current publications of these boards, and in return is furnishing them, through this division, with such special information as they may severally seek.

7. A special attempt has been made through the cooperation of competent architects from different parts of the country to prepare miniature models of country schoolhouses, made up in "knockdown" form, so that duplicates of these may be made and forwarded to school authorities in order to introduce better types of country school buildings.

8. The chief of the division has made personal investigations into the hygienic conditions of schools in various parts of the country, has counseled with school boards and school officers, and has delivered numerous public addresses on various topics of school hygiene and sanitation.

9. Bulletins are in course of preparation on the following topics:

- (a) The rural schoolhouse and its environment.
- (b) Bibliography (annotated) of school hygiene and school sanitation.
- (c) Medical inspection of school children.
- (d) Some types of new American schoolhouses.

DIVISION OF RURAL EDUCATION.

This division was created by an order of November 1, 1911, to have charge of the investigation of problems relating to rural schools. It was placed under the immediate supervision and direction of the Commissioner, with the assistant in rural education in charge as acting chief.

Since its organization the division has devoted the larger part of its energies to an investigation concerning the status of rural education in the United States, information being secured through pub-

lished school reports, State documents, and by personal inspection of rural schools. A report is being prepared which will give the results of the investigation. The division is collecting information relative to the best rural school work in the country. It has affiliated with it 37 special collaborators, each appointed at a nominal salary, to co-operate with the division in keeping it in touch with the best things being done in rural education. These collaborators are all persons whose work is directly connected with rural education, either in State departments of education, normal schools, or as county superintendents, and they are widely distributed throughout the country. Several of them are making special studies for the division of some phase of rural education, the results of which will be published by the bureau if they prove to be of sufficient national interest and value to warrant publication.

The division assisted in the preparation and revision of manuscripts for several publications. They include:

- Teaching language through agriculture and domestic science.
- Training courses in the United States for rural teachers.
- The readjustment of a rural high school to the needs of the community.
- The Farragut (Concord, Tenn.) Agricultural High School.
- The Wake County (N. C.) school farm movement.
- The Georgia Rural Sociological Club of the Athens Normal School.
- The Wisconsin County training schools for rural teachers.
- Industrial supervisors in rural schools.
- The status of rural supervision in the United States.
- An educational survey of Montgomery County, Md.

EDITORIAL DIVISION.

The following publications were issued during the year 1911-12:

- Annual Report of the Commissioner of Education for 1911.
- Annual statement of the Commissioner of Education to the Secretary of the Interior for the fiscal year ended June 30, 1911.
- Bulletin of the Bureau of Education:
 - 1910, No. 5. American schoolhouses.
 - 1911, No. 2. Opportunities for graduate study in agriculture in the United States.
 - 1911, No. 2 (supplement). Undergraduate or collegiate courses in agriculture.
 - 1911, No. 3. Agencies for the improvement of teachers in service.
 - 1911, No. 4. Report of the commission appointed to study the system of education in the public schools of Baltimore.
 - 1911, No. 5. Age and grade census of schools and colleges.
 - 1911, No. 6. Graduate work in mathematics in universities.
 - 1911, No. 7. Undergraduate work in mathematics in colleges of liberal arts and universities.
 - 1911, No. 8. Examinations in mathematics in the United States.
 - 1911, No. 9. Mathematics in technological schools of collegiate grade in the United States.
 - 1911, No. 10. Bibliography of education for 1909-10.

Bulletin of the Bureau of Education—Continued.

- 1911, No. 11. Bibliography of child study.
- 1911, No. 12. Training of teachers of elementary and secondary mathematics in the United States.
- 1911, No. 13. Mathematics in the elementary schools of the United States.
- 1911, No. 14. Provision for exceptional children in public schools.
- 1911, No. 15. The educational system of China as recently reconstructed.
- 1911, No. 16. Mathematics in the public and private secondary schools of the United States.
- 1911, No. 17. List of publications of the United States Bureau of Education available for distribution.
- 1911, No. 18. Teachers' certificates issued under general State laws and regulations.
- 1911, No. 19. Statistics of State universities and other institutions of higher education partially supported by the State.
- 1912, No. 1. A course of study for the preparation of rural school-teachers.
- 1912, No. 2. Mathematics at West Point and Annapolis.
- 1912, No. 3. Report of the committee on uniform records and reports.
- 1912, No. 4. Mathematics in the technical secondary schools of the United States.
- 1912, No. 5. A study of expenses of city school systems.
- 1912, No. 6. Agricultural education in secondary schools.
- 1912, No. 7. Educational status of nursing.
- 1912, No. 8. Peace Day (May 18). Suggestions and material for its observance in the schools.
- 1912, No. 9. Country schools for city boys.
- 1912, No. 10. Bibliography of education in agriculture and home economics.
- 1912, No. 11. Current educational topics, No. 1.
- 1912, No. 13. Influences tending to improve the work of the teacher of mathematics.

Library circulars—Monthly record of current educational publications:

- 1912, No. 1. January 15.
- 1912, No. 2. February 15.
- 1912, No. 3. March 15.
- 1912, No. 4. April 15.
- 1912, No. 5. May 15.

Miscellaneous publications:

- Federal laws, etc., affecting land-grant colleges.
- Definition of terms used in fiscal schedules.
- Rules and regulations regarding the Alaska school service for the natives of Alaska.
- Rules and regulations regarding the United States reindeer service in Alaska.
- Report on education of the natives of Alaska and the reindeer service, 1910-11.

The following documents have been prepared and were in the hands of the printer at the close of the fiscal year:

Bulletin of the Bureau of Education:

- 1912, No. 12. The Dutch schools of New Netherland and colonial New York.
- 1912, No. 14. Report of the American Commissioners on the Teaching of Mathematics.

Bulletin of the Bureau of Education—Continued.

1912, No. 15. Current educational topics, No. II.

1912, No. 16. The reorganized school playground.

1912, No. 17. The Montessori system of education.

1912, No. 18. Teaching language through agriculture and domestic science.

1912, No. 19. Professional distribution of college and university graduates.

1912, No. 22. Public and private high schools.

1912, No. 23. Special collections in libraries in the United States.

1912, No. —. Bibliography of the teaching of mathematics.

1912, No. 26. Bibliography of child study for the years 1910-1911.

In addition to its work in connection with the publications listed above, the editorial division has prepared and distributed a series of multigraph circulars containing information suitable for educational periodicals and for the educational departments of newspapers. This is in pursuance of the statutory function of the bureau to collect and diffuse educational information. The service has been highly appreciated, and the circulars have been widely published, thus reaching a large and important class of readers who never see the formal documents of the bureau. The editions of the latter are limited by law to 12,500 copies, and with such numbers only an exceedingly small proportion of the people of the United States can be reached directly. By selecting suitable portions of those documents, however, and preparing them for publication by the periodical press, it has been possible to increase a thousandfold the circulation of facts which are important for the people to know. The circulars are not confined to matter from the printed documents, although the latter form the basis of the majority of the items distributed. Important occurrences in any part of the educational field are noted, and especial attention is paid to events in Europe which might influence American educational conditions.

A new series of documents has been begun during the past year, namely, a monthly record of current educational periodicals, prepared by the library division. The circulars are issued for the benefit of librarians and others who desire to keep abreast of current educational literature. The favor with which they have been received shows that they supply a real need.

To a greater extent than heretofore the editorial division has, during the past year, aided authors in the preparation of manuscripts. This has included the collection and preparation of material as well as editorial work proper, and the scope of the work of the division has thus been considerably enlarged. Labor-saving machines have been installed for addressing and folding documents, and these have made it possible to extend largely the number of circulars distributed.

STATISTICAL DIVISION.

The Commissioner's annual report for 1911 includes educational statistics collected, tabulated, and summarized by this division. Reports were received from—

- 10,234 public high schools.
- 1,979 private high schools.
- 477 summer schools.
- 568 manual and technical training schools.
- 600 commercial schools.
- 388 negro schools.
- 115 State reformatories.
- 53 institutions for the blind.
- 130 institutions for the deaf.
- 45 institutions for the feeble-minded.

In addition to tabulating the above 14,384 returns, the division made a special tabulation of 10,068 public high-school returns, which, together with the statistics of private high schools, will appear in detail in a bulletin now in the hands of the printer. To obtain this material it was necessary to send out 42,881 schedules in separately addressed envelopes, second and third requests being necessary in thousands of cases. In addition, a special inquiry concerning the teaching of agriculture was sent to 3,937 high schools. Also a special request was sent to 14,000 public and private high schools to obtain lists of teachers and pupils, which work, including the receipt, arrangement, and classification of the returns, consumed at least one month's time of the entire division.

In addition to sending out the 60,818 requests mentioned above, the division prepared the mailing slips for about 9,000 copies of the annual report, writing about 18,000 addresses.

The work of preparing special statistics in answer to correspondents has been unusually heavy during the year, requiring on the average all the time of one clerk.

LIBRARY DIVISION.

With a view to extending the sphere of usefulness of this division, the attention of educators throughout the United States was recently called to the resources of the bureau library, and a general exposition made of the ways in which it may be of service—by the loan of its books when not immediately required for official use, by bibliographical guidance, and otherwise. The many responses already received to this offer reveal an opportunity for continued profitable extension of library service to students of education and teachers in both city and country. Our records show that during the year 665 volumes were loaned for use outside the office.

The annual accessions were as follows: Volumes and pamphlets, by gift, by exchange, and by purchase, 1,581; serial publications, 5,374 numbers; periodicals, 7,770 numbers. Receipts from the Library of Congress by transfer, under section 59 of the copyright act of March 4, 1909, aggregated 3,943 volumes, mainly school and college textbooks for incorporation in the special collection of this literature now under formation.

The number of volumes catalogued was 10,572, which includes many sets of city school reports. A total of 353 bibliographies was compiled, and numerous letters of inquiry answered.

The division prepared during the year a classified and annotated "List of publications of the Bureau of Education available for free distribution" and a "Bibliography of education in agriculture and home economics," for issue as bulletins, and beginning with January, 1912, compiled for publication as a library circular a monthly record of current educational publications.

CORRESPONDENCE DIVISION.

The amount of mail matter handled during the year has been greater than at any time in the history of the bureau. There were received 45,543 letters, and the bureau distributed 197,530 copies of its publications. Under the system of returning to writers letters requesting publications or information that could be supplied by printed matter, which was inaugurated in the previous year, the letters necessary to be placed on file have been reduced to an easily manageable basis.

The division has given some time to the inspection of the old letter files of the bureau for the purpose of preserving such letters as are of historical importance or useful for reference and laying aside for destruction such as are of no value. This work has been completed to include the files of the calendar year 1894.

THE ALASKA SCHOOL SERVICE.

During the fiscal year ending June 30, 1912, the field force of the Alaska school service consisted of 5 superintendents, 110 teachers, 7 physicians, 7 nurses, 2 contract physicians, and 2 hospital attendants. Eighty-six public schools were maintained with an enrollment of 4,018 and an average attendance of 1,805.

Without neglecting the work in the schoolrooms and the sanitary work in the villages, during the year special attention has been given to the medical work among the natives, which includes the maintenance of hospitals at Juneau and Nushagak under the direct management of the Bureau of Education, contracts with the Holy Cross Hospital at Nome and the Fairhaven Hospital at Candle for the

treatment of diseased natives upon the application of a superintendent or teacher in the Alaska school service, the employment of 7 physicians in hospital work and in relieving distress among the natives in their districts, the employment of 7 nurses in the hospitals, and in hygienic and sanitary work in the native schools and villages, also furnishing the teachers with medicine chests and simple instructions to enable them to treat minor ailments. Of the appropriation for education in Alaska, \$24,926.04 was expended in the medical work outlined above.

During the summer of 1911 Passed Asst. Surg. Milton H. Foster, of the Public Health and Marine-Hospital Service, made a preliminary investigation of health conditions among the natives of southern Alaska with a view to inaugurating adequate measures for their relief. One of Dr. Foster's recommendations was the extension of the medical work in connection with the Alaska school service. In pursuance of this recommendation and in order that the entire medical work among the natives of Alaska might have expert supervision, upon the request of the Secretary of the Interior, the Surgeon General of the Public Health and Marine-Hospital Service in March, 1912, detailed Passed Asst. Surg. Emil Krulish for service in Alaska for an indefinite period under the direction of the Commissioner of Education. With the consent of the Secretary of the Treasury, the duties of Dr. Krulish for the Bureau of Education will be (a) to supervise all measures for the medical and surgical relief of the natives of Alaska, (b) to act as instructor to the teachers of the United States public schools in Alaska in all matters pertaining to the sanitary education of the natives, (c) to give instructions to teachers in first aid to the injured or sick, and (d) to act in a general advisory capacity to the superintendent of education of natives of Alaska in all matters pertaining to sanitation, hygiene, maintenance of hospitals, and other matters of like character. The plans for the work of Dr. Krulish in Alaska include prescribing and enforcing regulations for the prevention and spreading of disease in the native villages.

During the summer of 1911 information was received that small-pox had broken out among the natives in the vicinity of New Ram-part House, north of the Arctic Circle, near the boundary between Alaska and Canada. Under instructions from the Bureau of Education, the superintendent of schools in the Upper Yukon district proceeded to the infected district to render all possible assistance in suppressing the epidemic. Finding that the disease was confined to Canadian territory, upon the suggestion of the governor of Alaska and in accordance with instruction from the Commissioner of Education, he maintained a quarantine station near the mouth of the Porcupine River, in Alaska, from August to October, 1911, which pre-

vented the disease from entering the Yukon Valley. As a precautionary measure, the representatives of the Bureau of Education in the entire Yukon Valley were liberally supplied with vaccine points and vaccinated all natives in the vicinity of the schools.

For several years there existed a desire among the members of the Hydah Tribe living in the villages of Klinquan and Howkan to migrate, their principal objections to the village sites being an insufficient supply of pure water and the necessity of leaving their homes for several months in order to obtain work. During the autumn of 1911 these natives migrated to a new site on the west shore of Prince of Wales Island, about 20 miles from the post office of Sulzer, advantageously located with regard to hunting and fishing grounds. By Executive order a tract of approximately 12 square miles has been reserved for the use of this colony and such of the natives of Alaska as may settle within the limits of the reservation. The natives have chosen the name of Hydaburg for their new village. The Hydaburg Trading Co., with a capital stock of \$5,000, has been organized to transact the mercantile business of the settlement. The Hydaburg Lumber Co. operates a sawmill, in the establishment of which the natives were aided by the Bureau of Education. A United States public school, under the Bureau of Education, opened in Hydaburg during September, 1911. The village has a population of 159.

When returning from its northern cruise the United States revenue cutter *Bear*, upon the request of this bureau, transported to Port Moller 44 Eskimos who were desirous of leaving the Nome region in order to settle near the better hunting and fishing grounds of the Alaskan Peninsula. It is hoped that a school can soon be established in this new settlement.

The eruption of Katmai Volcano in western Alaska, June 6, 1912, destroyed the homes of 98 natives, who were conveyed by the U. S. S. *Manning* to Ivanoff Bay, on the southern shore of the Alaskan Peninsula, selected as the site for a new village which will be under the supervision of the Bureau of Education. Materials for the construction of the houses to shelter these destitute natives and the most necessary articles for their use have been sent to them from Seattle.

The following is a summary of expenditures from the fund for education of natives of Alaska:

Expenditure from appropriation for education of natives of Alaska.

Appropriation	\$200,000.00
Salaries in Alaska	97,624.84
Equipment and supplies	18,069.13
Fuel and light	15,615.94
Local expenses	1,959.15

Repairs and rent.....	\$4, 605. 68
Buildings.....	9, 982. 73
Medical relief.....	24, 928. 04
Destitution.....	1, 457. 10
Commissioner's office salaries.....	6, 023. 50
Seattle office salaries.....	6, 216. 67
Commissioner's office expenses.....	320. 00
Seattle office expenses.....	1, 132. 04
Traveling expenses.....	11, 236. 38
Contingencies.....	800. 80
Total.....	200, 000. 00

THE ALASKA REINDEER SERVICE.

Reports covering the fiscal year 1912 have been received from only a few of the reindeer stations. The latest complete statistics are those of the fiscal year 1911, according to which the total number of reindeer in Alaska, June 30, 1911, was 33,629, distributed among 46 herds. Of the 33,629 reindeer, 20,071, or 60 per cent, were owned by 460 natives; 3,951, or 11 per cent, were owned by the United States; 4,663 or 14 per cent, were owned by missions; and 4,944, or 15 per cent, were owned by Lapps.

During 1909 arrangements were made with the Department of Agriculture permitting the exportation of reindeer meat, hides, and horns, under proper certification by the representatives of the Bureau of Education. It was not deemed wise, however, to encourage such exportations until the herds had increased sufficiently to supply adequately the local needs of natives and white men. Information having been received that the herds now furnish an ample source of supply of fresh meat to the native villages and towns in their vicinity, it was decided that the exportation could begin. In October, 1911, the first shipment of reindeer meat left Nome for Seattle. It consisted of about 125 carcasses purchased by a cold-storage company from Eskimo herders. This shipment of approximately 18,750 pounds found a ready sale in Seattle. It is probable that the exportation of reindeer meat from Alaska will eventually become an industry of extensive proportions.

The following is a summary of expenditures from the fund "Reindeer for Alaska, 1911":

Expenditures from appropriation for reindeer in Alaska.

Appropriation.....	\$12, 000. 00
Salaries of chief herders.....	520. 00
Supplies.....	9, 700. 48
Establishing new herds.....	675. 00
Contingencies.....	1, 104. 54
Total.....	12, 000. 00

MISCELLANEOUS.

The Commissioner has spent much of his time in the field, attending conventions of teachers, school officers, and others interested in education and working toward the solution of some of its many problems. He has visited schools of all kinds and grades and conferred with the responsible officers of State, county, and city schools and school systems, and has made about 200 public addresses in 24 States and Porto Rico.

Within the year two new divisions have been created in the bureau: The division of school hygiene and sanitation, October 19, 1911, and the division of rural education, November 1, 1911. The reports of the work of these divisions are included in this statement.

A series of careful and exhaustive studies of the development of popular education in the several States has been begun, and their results will be published from time to time as bulletins of this bureau. It is believed that these will aid in the further development of education and make easier the task of the future historian of education in this country.

To assist the Commissioner and the specialists in the bureau to keep in closer touch with rural education, industrial education, and the work in school hygiene and sanitation in different parts of the country and in obtaining such information about these as can not be had through formal reports and other ordinary means, 42 special collaborators have been appointed at the nominal salary of \$1 a year. These collaborators are men and women working under such conditions as enable them to render valuable service to the bureau without interfering with their regular duties. Two of these, absent on leave from their regular duties in the institutions with which they are connected, now have desks in the office of the bureau and are preparing manuscripts to be published as bulletins. The appointment of other collaborators will be recommended from time to time until all parts of the country are represented in this way.

Pursuant to a call of the Commissioner, representatives of the departments of education of a large majority of the States met at St. Louis at the time of the annual meeting of the Department of Superintendence of the National Education Association in February, 1912, to discuss with him plans for a more effective cooperation of this bureau and the State departments in collecting statistics and other information pertaining to education. The unanimous and hearty approval of the general outline of plans submitted strengthens the hope that there may soon be such cooperation as will enable both this bureau and the departments of education of the several States to make their reports more comprehensive and accurate.

The legislative, executive, and judicial appropriation bill for the year 1913, which has passed since the close of the fiscal year for which this statement is made, increases the lump-sum appropriation "for the investigation of rural education, industrial education, and school hygiene, including salaries," from \$6,000 (1912) to \$15,000. The larger part of the increase in this lump sum will be used for the salaries of additional specialists in rural education, to enable the bureau to give to the States and local communities a little more of the help so much needed in building up efficient rural school systems. Smaller portions will be used to extend the work of the division of school hygiene and sanitation and for special studies in industrial education.

RECOMMENDATIONS.

I renew my recommendations of a year ago (statement of the Commissioner of Education to the Secretary of the Interior for the fiscal year ended June 30, 1911) that provision be made—

1. For an Assistant Commissioner of Education, who should be a specialist in secondary education, and serve also as the chief of a division of high schools.

2. For additional specialists in higher education.

3. For a group of specialists in industrial or vocational education.

4. For a specialist and assistants in city school administration.

5. For a specialist in the history, theory, and practice of education, who shall serve as a director of investigations and give assistance to other specialists in the bureau and to students of education, committees, and commissions who apply to this bureau for help in their investigations.

6. To enable the bureau to carry on cooperative experiments in elementary and secondary education under varying conditions and in different parts of the country, the results of these experiments to be published by the bureau for the information of the people.

7. For additional clerks to carry on the present routine work of the office and such additional work of this kind as may become necessary because of the larger work planned, and for a sufficient appropriation for traveling expenses to enable the Commissioner and the specialists in the bureau to do their work effectively.

I recommend further—

1. That provision be made for additional specialists in rural education and in school hygiene and sanitation. The work which the bureau should do in these subjects is much larger than can be done by the present staff and with the appropriations now made for these purposes.

2. That the limitations on salaries which may be paid specialists in this bureau be removed, or made such that the continued services of

competent men and women may be obtained. The bureau can never do effectively the most important work for which it was created until it can retain in its service men and women of learning, experience, working capacity, and expert knowledge such as will win for their opinions and utterances the respect of the leaders in all lines of educational thought and activity. This can not be done so long as salaries are limited to the low maximum which the law now permits to be paid in this bureau.

RECOMMENDATIONS IN REGARD TO ALASKA.

Adequate provision for the medical relief of the natives of Alaska is an urgent national duty. The use of part of the appropriation for education in Alaska for the suppression of disease among the natives is an emergency measure. This most important work should receive serious consideration and prompt action on the part of Congress. I would recommend a liberal appropriation for this purpose.

I also renew my recommendation for the passage of a compulsory school-attendance law for Alaska. That results commensurate with expenditures may be obtained, a law compelling regular attendance in the schools is needed.

All of which is respectfully submitted.

P. P. CLAXTON,
Commissioner.

To the SECRETARY OF THE INTERIOR.

**REPORT OF THE DIRECTOR OF THE UNITED STATES
GEOLOGICAL SURVEY.**

245

REPORT OF THE DIRECTOR OF THE UNITED STATES GEOLOGICAL SURVEY.

GEORGE OTIS SMITH, *Director.*

The appropriations for the work of the United States Geological Survey for the fiscal year 1911-12 comprised items amounting to \$1,507,920. The plan of operations was approved by the Secretary of the Interior and a detailed statement of the work of the several branches and divisions of the Survey is presented on later pages of this report.

SPECIAL FEATURES.

NEED OF A SURVEY BUILDING.

GENERAL UNFITNESS OF BUILDINGS NOW OCCUPIED.

The record of the work of the Geological Survey during the fiscal year 1912 may fitly be preceded by a statement of the conditions under which that work has been done, not as an apology for either the quantity or quality of the results of the investigations made, but rather as an exhibit of the limitations forced upon this bureau—limitations on economy and efficiency which seriously hamper all efforts for better administration in the expenditure of public money.

The offices of the Geological Survey have become wholly inadequate and unadapted to its needs. Since 1884, when the Survey was first quartered in the Hooe Building, at 1330 F Street, the effort has been frequently made to provide for the growth of the organization by adding wings and extensions to the building, but every increase in floor space has been made at the expense of proper lighting of the older portions of the building, so that its fitness for the Survey's use has been steadily impaired, and the resultant conditions constitute an actual detriment to health and a menace to life and property, as well as an obstacle to efficiency. The conditions under which the Survey employees work in the Washington office are to be condemned for both humanitarian and business reasons.

EFFECTS OF CROWDED OFFICES.

Under the humanitarian clause of the indictment the present quarters of the Geological Survey can be described without exaggeration as in large part comparable in crowded and insanitary conditions to a sweatshop. Treatment of wage earners that would excite severe criticism if a corporation were the offender is tolerated in the case of these employees of the Federal Government. The crowded condition of the building occupied by the Geological Survey is so manifest to every observer that it needs to be described only for the information of those who have not had occasion to visit the offices.

In one division of the Survey statistical clerks have each on an average only 73 square feet of floor space. In another branch of the Survey the floor space allotted to each person is $67\frac{1}{2}$ square feet, and in still another section, in which the workers are for the most part scientists, the average space per man is 102 square feet. The figures given do not measure the actual working space available, for not only must desks and chairs be provided, but also bookcases, large file cases, and in many rooms drafting tables.

LACK OF FRESH AIR AND LIGHT.

The congestion will become more apparent if the ventilation and lighting of these rooms are considered. If instead of floor space the cubic capacity of the rooms occupied is measured, it is found that the average volume of air per person is about 652 cubic feet, again without allowance for the considerable space occupied by furniture and therefore not available for air. Certain more or less definite standard minimum requirements for cubic contents have come into use for various classes of public buildings, these requirements being based on the customary allowances for fresh air. Thus public libraries are planned with not less than 2,400 cubic feet, hospitals with a minimum of 1,440 cubic feet, and barracks with not less than 720 cubic feet of space per occupant. The average cubic space available for each person occupying the Survey rooms is therefore below even the minimum allowed in barracks and only a fraction of that allowed in other buildings. Indeed, in five of the Survey rooms, each with two occupants, the allowance is less than one-half of the minimum required for barracks. When the ventilation of these particular rooms is taken into account the showing is even worse, for more than half the windows open into interior wells and the rest into alleys, and no system of artificial ventilation is provided, these conditions unfortunately being typical for a large proportion of the Survey rooms.

In the matter of lighting the conditions are no more favorable. In one of the divisions already cited the average window space per clerk

is two-fifths of a small window, and here again many of the windows open into interior wells, so that in most of the rooms artificial light is necessary on dark days and even for several hours on clear days in winter. The generally crowded condition has compelled the occupancy of several rooms in which artificial light must be used practically all the time. In one of the scientific sections the largest floor space assigned to one man—162 square feet—is in a room where the light is so poor that artificial illumination is needed most of the time, and the strain on the occupant's eyes is so great that rotation in assignment to this office is practiced in order that permanent injury to any one employee may be avoided if possible.

While permanent or temporary injury to the eyesight of some of the geologists and draftsmen can be definitely traced to the poor lighting of the rooms in which they have been forced to work, it is more difficult to trace the results of insufficient ventilation. That the unhygienic conditions prevailing in the building occupied by the Survey must necessarily lower the tone of the health of its employees is apparent. The customary standards for ventilation provide for a minimum of 1,000 to 3,000 cubic feet of fresh air per hour per occupant. It is doubtful whether, under the conditions prevailing in the Survey's offices during the winter, the supply of fresh air averages 600 cubic feet per hour per occupant, which is only 20 per cent of the quantity required by the higher standard now widely used to provide a proper factor of safety for the health and efficiency of employees. Without considering the effects of dust and noise, to which the employees of the Survey are subjected by reason of the location of its present quarters, it is certain that the overcrowding, resulting as it does in lack of proper lighting and ventilation, must seriously impair the health of these Government employees.

The results of this violation of practical hygiene would be more widespread and more apparent were it not for the fact that a considerable number of the members of the Survey are field men, whose work during the summer is performed in the open air where they have opportunity to recuperate each year. This open-air work may protect certain members of the force from lung disease and from defective vision, but it does not make the congested conditions seem any more tolerable to a geologist or topographer who has been assigned 1,000 square miles for five months of field service and is obliged to work the remaining seven months of the year with an allowance of 100 square feet of floor space.

ROOMS TOO HOT FOR OCCUPANCY.

The top floor in the main building of the Survey and the loft in the annex becomes so hot in the summer that at times it is impossible for the employees occupying these floors to perform their duties,

and indeed they frequently have to be assigned to work elsewhere. The larger part of the top floor, however, is for this reason occupied by field men, who usually are absent from Washington during the hot weather. In the loft of the annex, an old building in an alley, the summer temperature runs as high as 110° F., and neither the employees nor the solutions and emulsions used in the photographic laboratory there can be depended on for high-grade results under these conditions.

THE FIRE RISK.

A menace second only to the existing danger in health is the risk to public records. Estimates have been made at various times of the money value of the records necessarily stored in the Survey building. The latest inventory shows a present value of \$4,840,000, and this value represents largely the amount that would necessarily be expended in duplicating the unpublished material and in replacing the large stock of map plates which could be reengraved from published maps. Moreover, there is a sense in which the loss in official records can not be estimated in dollars. The detailed stream-gaging records for 20 years could not be replaced except by another 20 years of observations, and similarly, unpublished geologic data contained in notebooks and plats and represented by the working collections of specimens could hardly be replaced, except in an equal length of time. The land-classification work of the Survey is now proving how invaluable are these unpublished data, accumulated during the last 33 years, and a destructive fire in the wing of the building occupied by the land-classification board would destroy records whose loss would long delay the issuing of land patents throughout the public-land States.

The Survey library is a collection of geologic literature that in degree of completeness can not be duplicated elsewhere in this country, if indeed in the world. This library therefore has a value which can not be easily estimated, since, if destroyed, it could not be wholly replaced, and such portion as is replaceable could be duplicated only at great expense of time and public money.

It is believed that every safeguard against fire that is possible through an efficient watch service and the careful distribution of fire extinguishers has now been provided, but the fact remains that although the building is constructed of iron and brick it is honey-combed with light wooden partitions, which present some 2 acres of surface that could be easily ignited. Even if these wooden partitions should be replaced with fireproof ones the building would still be classed with the third-rate risks because of the lack of protection of the bottom flanges of the I beams that support the floor arches. A fire once started in this large amount of inflammable material would

result in quick buckling of the unprotected iron beams, and the consequent collapse of the floors would make the fire hard to fight.

The exterior fire risks should also be considered, inasmuch as all the buildings in the block, except two, present even greater fire risks than the building occupied by the Survey. During the last nine years there have been four fires in the Survey building, and it is notable that the latest fire, which occurred on a Sunday, originated on the first floor of the building, in a store over which the Government has no jurisdiction, although the fire was discovered by a Survey watchman, and the spread of the fire in the Survey library was checked only by the efforts of the watchmen and the members of the Survey who happened to be in the building at the time.

RESULTS OF OFFICIAL INSPECTION.

On April 14, 1911, an inspection of the Survey buildings was made at the request of the Director by the District fire marshal and inspector of fire escapes, whose detailed report presents suggestions for the better protection of the occupants in case of fire or other emergency. On April 25, 1911, a further inspection was made by a special subcommittee of the House Committee on Public Buildings and Grounds, accompanied by the chief engineer of the fire department. Both inspections convinced those who made them that the buildings were unadapted for Government use and resulted in certain recommendations, which have been put into effect, except one by the fire marshal that the use of the annex loft be discontinued because it is "utterly unfit" for the purpose for which it is used.

IMPAIRMENT OF EFFICIENCY.

The third great objection to the longer continuance of the Survey in these rented quarters is a practical one. Maximum efficiency is impossible with such congestion and the attendant inadequate ventilation and lighting and with the impossibility of systematically arranging the offices and working collections; and the dirt and noise consequent upon the Survey's location at the very business center of Washington present further obstacles to economical administration. The whole situation not only results in less efficient use and hence in actual waste of Government money, but also on that account creates a feeling of dissatisfaction and discouragement among the highest class of scientists and other members of the Survey, who wish to make the largest and best contribution possible to the public service.

The present overcrowding has already been considered with respect to hygiene, but the consequent loss in efficiency is greater than that measured simply by impairment in health. Tests have shown that

light suitable for clerical or technical-clerical work fails at approximately a distance of 15 feet from the window line, yet 12½ per cent of the floor space occupied in the main building is more than 15 feet from the windows, and this computation is based on the assumption that the windows in the light wells are as effective for lighting as are those on the exterior walls. If, however, a lighting factor of 50 per cent is assumed for the well windows on the lower floors, an estimate which appears to be liberal, the space unsuited for clerical work in the building is found to be 33.8 per cent. It is evident that both the quantity and quality of work performed in the poorly lighted portions of these rooms must fall far below the standard that could be attained with better lighting.

In a similar way with the deficiency in ventilation: even where the presence of various noxious gases does not actually result in pronounced ill effects on the health, the lack of pure air results in relative inefficiency in the mental processes of employees subjected to the conditions described.

INCONVENIENCE DUE TO LACK OF PROPER SPACE.

The crowding of the Survey building precludes a systematic arrangement of offices and of working material, including specimens, notes, and maps, that should be close at hand for repeated reference. Specimens, for instance, are stored not only in the offices of the geologists but also in the halls, and where the limit of floor safety has been reached for such storage, collections are packed up and placed in the cellar, where they can not with any propriety be called accessible.

Sections and divisions in the Survey which should be close together are now far apart, and even the members of the same part of the organization are scattered in different parts of the building. The growth of the topographic branch has necessitated the renting of additional quarters in another building, into which a portion of the technical force has overflowed. Another instance of undesirable separation of related sections is seen in the fact that the offices of the editor of texts and the chief of the section of illustrations, who should be in frequent consultation, are necessarily located in widely separated parts of the building. Similarly, most of the paleontologists, whose work is closely connected with that of the other geologists and who should be, therefore, in close touch with them, have been crowded out of the Survey building and have been quartered in the National Museum, through the courtesy of the Secretary of the Smithsonian Institution. This separation of men engaged in researches which ought to be closely correlated is seriously retarding the scientific work.

DIRT AND NOISE FROM WITHOUT.

The location of the building occupied by the Survey on the busiest street in town brings its attendant evils of dirt and noise. Not only do the neighboring chimneys pour out soot and fine cinders that keep the books, files, and records covered with dirt, but on three sides the building is bordered by a street and alleys, which are a constant source of additional dirt and also a source of noise. These alleys, which afford access to a theater, two newspaper offices, a hotel, an office building, and several saloons, necessarily have an almost constant traffic of heavy wagons, and the noise of these passing up and down the cobblestones is deafening; the only variations are the rehearsals of a summer opera company and the chorus of yells by newsboys who congregate at the rear of the Survey building awaiting the various editions of an afternoon paper.

The street noises in the summer, when the windows must be opened, are so great and annoying that it is at times impossible to use the rooms on F Street for dictation to stenographers, and to use the telephones in those rooms it is often necessary to close the windows temporarily. The almost constant passage of heavy cars along F Street, in front of the building, sets up vibrations so great that at times scientists wishing to use delicate instruments have been obliged to do such work at intervals after midnight, and even then the effect of vibration was not wholly avoided.

DISTRACTING NOISES IN THE BUILDING.

In addition to the prevalent noises of exterior origin, which constitute a great drawback to intellectual work, there are interior noises, inevitable upon the crowded condition of the building—noises that are amplified or intensified by numerous wooden partitions, which constitute excellent sounding boards.

The common arrangement of placing a stenographer in a room occupied by a high-salaried man engaged in scientific investigations is not to be commended for its efficiency, yet the present congestion is so great that relatively few of the geologists are ever free from the distracting noise of the typewriter. In the computing section of another of the scientific branches six or seven hydraulic engineers are crowded into a single room, together with an adding machine or two. Inasmuch as hydraulic computations require constant attention and freedom from diverting noises, it is plain that larger quarters and some degree of isolation would facilitate the work. A careful estimate places the possible increase in efficiency at 30 per cent, which would represent an annual gain of several thousand dollars in this one section alone.

INCREASE OF EFFICIENCY POSSIBLE UNDER BETTER CONDITIONS.

Several other estimates have been made by the administrative officers of the Survey of the increased degree of efficiency that could be attained by changing the quarters for the various classes of employees from indifferent or worse to suitable accommodations. The estimated increase ranges from 15 to 30 and even to 50 per cent. A significant statement, based on recent experience, is made by one of the geologists. While quarantined at home he continued his Survey work in a large, well-lighted, clean, and quiet study and found, as a result of this practical test of doing the same kind of work under these different conditions, that he could accomplish 50 per cent more than in his Survey office, which happens to be one of the best in the building. This increase was in part attributable to freedom from interruption, but it is believed to be largely due to better light and air, lack of crowding, and freedom from noise.

PRESENT QUARTERS OF SURVEY UNWORTHY.

Another argument for a special building is hardly less practical in its ultimate bearing. The present housing of this Federal bureau is unworthy of the Nation. Both the work and the workers of the United States Geological Survey have an international reputation, and visiting foreign scientists do not conceal their astonishment at the miserable environment in which these investigations are being carried on. Our neighbors on this continent, in Canada and Mexico, have erected buildings especially adapted to the work of their geological surveys, which are properly housed, as is nearly every other geological survey in the world, and yet the geological survey of no other nation compares in size of organization or scope of work with that of the United States. In fact, the surveys of several of the larger European countries are organizations whose personnel is comparable in number only with that of single divisions of the American Survey.

The practical side of this feature is the increased inducement that suitable quarters would afford in retaining in the Government service men of the highest professional talent. At best, most of these investigators are carrying on their Government work at a financial sacrifice, and the temptation to go into professional or corporation work at largely increased salaries is strengthened by the contrast between the well-lighted and sanitary offices generally provided in the business world and the noisy, dirty, dark, and crowded quarters offered by the Survey. To retain in the Government service the best men is by far the largest administrative problem of the Director of the United States Geological Survey.

STATUS OF LEGISLATION FOR NEW BUILDING.

The present status of the legislation providing for the erection of a building for the Geological Survey may be briefly stated. After efforts extending over 27 years an item authorizing the construction of a building was included in the sundry civil appropriation bill as reported to the House of Representatives at the second session of the Sixtieth Congress, but it went out on a point of order. In the same year (1909) the House Committee on Public Buildings and Grounds unanimously reported a bill making the same provision, but this also failed of consideration. Similar favorable recommendation from this committee had been reported as early as 1889. The public buildings act approved June 25, 1910, however, directed (in sec. 32) the preparation of designs and estimates for a building for the accommodation of the Geological Survey and other bureaus of the Interior Department and made available for this purpose a balance of \$96,506.20 remaining from an appropriation originally made for the purchase of the square bounded by E, F, Eighteenth, and Nineteenth Streets NW., on which, by the terms of the act, the proposed building is to be erected. On May 20, 1911, the Secretary of the Treasury transmitted to the Speaker of the House of Representatives sketches prepared for such a building, with five preliminary estimates of cost, ranging from \$1,950,000 for a three-story brick building to \$4,900,000 for a seven-story stone building. The larger amount is approximately the same as the replacement value of the public property that would be safeguarded by the erection of such a building and that is now exposed to the considerable fire risk in the Survey's present quarters. The act authorizing these estimates specifies a "fireproof building of modern office-building type of architecture." These plans and estimates were referred to the House Committee on Public Buildings and Grounds of the Sixty-second Congress.

PROGRESS OF SCIENTIFIC WORK.

CONTRIBUTIONS OF ECONOMIC WORK TO "PURE SCIENCE."

Notwithstanding the growth of the Survey work along practical economic lines, scientific work has not been neglected. In fact, in the Geological Survey the scientific investigations are inseparable from the economic work, though the one or the other may predominate in purpose according to the needs of the particular research in hand. In any field economic work of the highest rank is impossible without full knowledge of the scientific laws and principles pertaining to the subject of the work; but as there is no application of geology which does not involve unsolved problems, some of them of the highest importance, the best knowledge available is nevertheless rela-

tive. It thus follows that the broad and searching observations which should accompany every piece of good economic work comprehend data that are eventually combined in the construction of new scientific hypotheses, some of which, as more observations accumulate, grow into established laws or principles that are in turn of the greatest practical consequence. Thus the detailed studies of the metalliferous deposits in one region or another bring to light evidence from which to determine the genesis of the ores and the modes or conditions of their occurrence, and the economic inquiry becomes more intelligent and successful when once this new principle regarding the mode of an ore occurrence is understood.

On account of the plain duty of this Federal service to minister to the immediate needs of the various mining districts, it is not generally possible to concentrate and direct the observations to a series of regions systematically chosen as suited soonest to furnish the requisite data bearing especially on some particular scientific problem, however important and advantageous its solution may be; but nevertheless the data are gradually accumulated for the interpretation of many of these problems without sacrifice of the Survey's obligations to the public. An interesting illustration of the deduction of a principle from data so accumulated is found in the paper by W. H. Emmons on the enrichment of sulphide ores, the manuscript of which has been completed during this year. Another illustration of scientific results based on a long period of field studies, pertaining mainly to economic areas, is found in the pre-Paleozoic history of central North America, as described in the monograph by Van Hise and Leith on the geology of the Lake Superior region, which appeared during the year.

Among other long-term studies more distinctly scientific in character may be mentioned particularly the investigations, made under Mr. Vaughan's direction, of the formations of the southern Coastal Plain and Gulf embayment, which, though having an economic object, are yielding important contributions to our knowledge of the stratigraphy, physiography, and geologic history of this province; the work under the direction of Mr. Cross in the San Juan region of southwestern Colorado, which, in connection with the thorough geologic studies made during the preparation of folios, is affording new scientific results of a high order concerning especially the volcanism and physiography of the region; and the studies begun last year by Messrs. Campbell and Alden in the Glacier National Park, which promise important results concerning the origin of the structure and physiography of this part of the Rocky Mountains and of the glacial topography, which, as it is still "in the making," offers exceptional opportunities for scientific study as well as observation by the traveler interested in the natural wonders of his own

country. Important regional studies of high scientific rank which should also be mentioned are those prosecuted by Mr. Keith and his associates, on the difficult stratigraphy and intricate geologic structure of the older Paleozoic regions of western New England and the Appalachian region, the results of which are partly published in folio texts, and those carried on by Prof. Emerson in southern New England. A report by Prof. Emerson on the geology of Massachusetts and Rhode Island has been submitted during the year.

PALEONTOLOGIC WORK.

The paleontologic work of the Survey continues to be of the highest rank. Many of its publications, written by the most distinguished representatives of the various branches of paleontology in the country and embodying experience and observations gathered during years of patient research, have contributed much to the scientific reputation of the organization. The descriptive paleontologic papers are often treated as "pure science;" yet instructive, striking, or tedious as may be these delineations of the groups of animal or plant life which lived on the globe in some particular epoch, there is not one of these papers describing the fauna or flora of a formation that does not prove sooner or later to possess practical value and to be essential to geology in its constantly increasing refinement of study and results. Without paleontology the geologic classification of formations, their correlation, and the determination of their mutual relations would be impossible. In fact, real and symmetrical progress in geology is impossible without corresponding interrelated development and refinement of its handmaid paleontology. The economic geology of any region of complicated structure is blind and inconsequent unless the time relations of the strata concerned are known. The monograph now being issued from the press on the Cambrian Brachiopoda, prepared by ex-Director Walcott and representing many years of painstaking study and distinguished attainment, embraces our best and most complete presentation of the criteria for the discrimination of the Cambrian formations in America and will for many years be a manual for the use of workers in Cambrian geology and paleontology. This monograph brings deserved credit to American science and to the Geological Survey, under whose auspices most of the work was accomplished. Other paleontologic publications specially deserving mention by reason of their scientific merit are J. P. Smith's *philon* on the Mesozoic and Cenozoic Echinodermata of the United States by W. B. Clark and M. W. Twitchell, the manuscripts for both of *sophic* treatment of the Middle Triassic faunas, and the monograph which are now in hand. Works like that of Kindle on the Onondaga

fauna, lately printed, and those by Berry on the Upper Cretaceous and Eocene floras of South Carolina and Georgia and by Stephenson on the Cretaceous deposits of the eastern Gulf region, both now in manuscript, are indispensable to geology. In these papers the stratigraphic value and the practical application of the results of the paleontologic investigations are given much prominence. The two papers last named are based on materials gathered in the course of the study of the Coastal Plain already mentioned, the economic motive for which was the investigation of the underground water resources. They are therefore representative of a series of scientific reports resulting from studies whose immediate object is economic.

WORK ON GEOLOGIC FOLIOS.

The folios describing and mapping in detail the geology of quadrangles in different parts of the country are regarded as mainly scientific, though always giving attention to the economic resources of the region. The areal studies now in progress in the valley region of central Alabama, a part of which has been described by Mr. Butts in the Bessemer-Vandiver and Montevallo-Columbiana folios, now in hand, promise important additions to the geologic history of the southern Appalachian region. On the other hand, the Claysville (Pennsylvania) folio, which has been issued during the year, affords a striking example of the first-hand aid in oil and gas development to be derived from the careful delineation of geologic structure and its economic explanation. Not inferior in scientific value to the papers just cited, though primarily economic, are such reports as those by Messrs. Brooks and Prindle on the Mount McKinley region, Alaska, and by Messrs. Calkins and Emmons on the geology and ore deposits of the Philipsburg quadrangle, in Montana.

WORK IN LAND CLASSIFICATION.

An important and interesting effect upon the scientific work of the Survey has resulted from the work in land classification. The constantly increasing demand for both completeness and exactness of information regarding the mineral resources of the public lands under classification have developed methods and scope of view in this economic work that have exerted a marked influence on the folio work in other areas.

Thus, the training and methods developed in the course of the classification of the coal lands have brought about higher standards of refinement in stratigraphy, as well as in economic work, in other regions of the country. Another very notable illustration of scientific results springing from the study of economic problems is found in the administration of the Weeks Act. The intensive hydrometric

experimental studies carried on in order actually to show, in accordance with the terms of the law, the degree of protection afforded by forests to soil and water in certain areas proposed for purchase as national forests have resulted in empirical determinations and demonstrations of high scientific value as well as of tangible economic importance.

WORK ON OIL AND GAS.

The principles governing the origin and mode of occurrence of petroleum and natural gas are as yet but fragmentarily grasped. Every oil field examined in detail contributes its data for use in the eventual interpretation of the problems, and each pool is studied with keen alertness for the discovery of some key which may aid in the coordination of the data, which sometimes, according to the region and conditions, seem, on account of our lack of knowledge, even to be in conflict. The observations made by the Survey geologists in the oil and gas fields of California and Kentucky promise to further the solution of some of the problems, and by pointing out the relations of oil and gas occurrence to the geologic structure of the regions examined they have rendered important scientific as well as economic aid in oil and gas development; but the basic principles controlling the widely varied modes of occurrence and accounting for the differences in kinds of the oils in widely separated regions are possibly still far from view.

THEORETIC WORK BY SURVEY GEOLOGISTS.

On account of the more conservative and dignified character of the official publications of the Survey and the care taken to confine their substance to matters of demonstrated fact, they do not offer to the geologists the forum for free discussion of scientific theories and problems that is afforded to those periodicals and serial publications of scientific societies which are especially devoted to matters of strictly professional interest and which are more widely distributed among scientists. For this reason many of the scientific results of the Survey's operations are first published in these journals. Examples of papers of high rank contributed in this way are numerous. Without implying relative merit among these, mention as typical may be made of the paper by Mr. Campbell, "Historical review of theories advanced by American geologists to account for the origin and accumulation of oil," published in *Economic Geology*, vol. 6, No. 4, and that by Mr. Ulrich, entitled "Revision of the Paleozoic systems," printed in the *Bulletin of the Geological Society of America*, vol. 22, No. 3. Besides contributing to the programs of other scientific societies in Washington, the members of the Survey maintain for the discussion of purely geologic topics three profes-

sional societies, including the Geological Society of Washington, before which Mr. Campbell's paper, just cited, was presented as a presidential address. Meetings of some one of these societies or of their sections average two a week for the winter and by far the greater number of the papers read are offered by members of the Survey.

EDUCATIONAL WORK OF THE SURVEY.

Closely connected with the scientific work of the Survey is its educational function, which has not on the whole received the attention that so importantly useful a work deserves. The Survey has, however, in cooperation with several State surveys, participated in the preparation of a number of educational bulletins that have, in accordance with the agreements, been submitted to the respective States for publication. As distinctly educational in their scope, though far from elementary, should be named the valuable paper by Mr. Willis entitled "Index to the stratigraphy of North America," published as a professional paper in explanation of the new geologic map of the continent, and the paper by Messrs. Tarr and Martin describing the earthquake phenomena in the region of Yakutat Bay, Alaska.

A notable contribution to the study of physiography was the Survey's Professional Paper 60, "The interpretation of topographic maps," by R. D. Salisbury and W. W. Atwood, consisting chiefly of reprints of parts of the Survey's maps and of brief suggestions as to the origin and history of the features shown on them. For many years the topographic maps made by the Survey have been regularly used in the courses of instruction in geography and physiography in most of the universities and colleges and to some extent in the secondary schools. It is very gratifying to note that the maps prepared in accordance with the present high standard, and more fully adapted to such use, are coming to the attention of teachers in the graded and country schools. Teachers of schools located in the quadrangles surveyed in recent years find the corresponding topographic sheets a most practical and invaluable aid to their efficiency and success in teaching elementary geography.

LAND-CLASSIFICATION POLICY.

Formal action was taken on May 1, 1912, giving the land-classification board the rank of an independent branch within the Geological Survey. This recognition of the increasing importance of this phase of the work of the bureau is in line with other developments in the present public-land policy, which has highest utilization as its purpose. The present epoch in public-land legislation and administration may be said to date from 1888, when Congress made special provision for an irrigation survey and authorized the with-

drawal or reservation, pending further legislation, of the reservoir sites and irrigable lands designated as a result of special investigation by the Geological Survey. This legislation was simply the forerunner of the reclamation act of 1902, which is most notable as providing a practical means of insuring that the irrigable lands thus classified shall be put to their highest use, through a Federal agency, the Reclamation Service. In a somewhat similar way the act of June 4, 1897, marked the beginning of a national-forest policy of administration on a scale that later necessitated the organization of another technical corps, the Forest Service. The legislation of 1897 is interesting in this connection as providing specifically for examination and survey of forest areas by the United States Geological Survey for purposes of land classification.

During the last decade, however, "classification of the public lands," the first of the statutory functions of the Geological Survey, has come to take a large share of its activities. The field data accumulated as the result of three decades of geologic and topographic surveys, of stream measurement, and of detailed investigation of every mineral resource now contribute to putting into practice this business policy. In practice land classification means simply the determination of highest use. To encourage development and at the same time to enforce wise utilization by preventing partial or wasteful use is to protect the public interest. With the different values of the land made known by adequate examination, the highest use can be determined and, in so far as the statutes are in accord with economic law, the highest use can be assumed.

The scientific classification of the Nation's lands is now an integral part of the public-land administration. The field work of the geologist and the engineer is made to contribute to a business policy in the management of the Nation's real estate along three distinct lines. Quantitative knowledge of the land and its resources is now made a preliminary, first, to disposition of lands under the various settlement and development laws; second, to reservation of lands from present acquisition pending the enactment of adequate legislation; and third, to valuation of lands where the statute provides for disposition at prices expressing known value. For each of these phases a statement of the past year's work will best serve the purpose of illustration.

The determination of the character and the highest use of land for the purpose of disposing of it under the appropriate law includes its classification as mineral or nonmineral and as irrigable or non-irrigable. Upon the questions of fact as to mineral character depends the passage of title from the Government under the agricultural or mineral laws and the applicability of certain railroad non-mineral land grants. The total area classified for these purposes in

the fiscal year ended June 30, 1912, was one and a half million acres. The questions involving water supply on the public lands bear directly upon the administration of the statutes encouraging irrigation and dry farming, namely, the Carey Act and the desert-land and enlarged-homestead laws, as well as various right-of-way statutes. Upon the determination by field engineers of the quantity of water actually available for reclaiming the arid lands must wait the development of the remnant of agricultural lands in the public domain. Hydrographic classification of lands to serve this practical end aggregated last year more than 2,000,000 acres.

The second phase of activity in land classification is one that provides for future rather than present disposition of the public domain. The withdrawal act of June 25, 1910, looks forward to better utilization in the future and opens up the question of amendment of present laws by specific provision for reservation from immediate disposal of oil and gas and phosphate lands and of power and reservoir sites. Under the authority of the statute the Geological Survey during the fiscal year 1912 recommended the executive withdrawal of more than one and one-third million acres of oil reserves and almost one and one-fifth million acres of phosphate reserves, based on geologic data; of more than one-third million acres of water-power sites and 60,000 acres of irrigation-reservoir sites, based on hydrographic and topographic surveys; and of 86,000 acres of public water reserves essential to the control of public grazing lands. The areas of the outstanding withdrawals are approximately four and three-fourths million acres of public lands chiefly valuable for oil and gas, three and one-third million acres of phosphate lands, more than one and four-fifths million acres of lands essential to water-power development, nearly one hundred thousand acres primarily valuable for irrigation storage, and 86,000 acres of lands including springs or other watering places, unrestricted access to which, by the public, is essential in connection with the free use of the public range. The areas thus described as withdrawn, however, include tracts of privately owned land, which are in reality unaffected by the orders of withdrawal, although located in the larger legal subdivisions enumerated in those orders.

The third and most direct application of science to national stewardship is the valuation of the public coal lands. The coal-land law of 1873 is essentially a sales rather than a settlement law and provides for a minimum selling price. Since 1907 coal lands have been sold at appraised prices fixed by the Geological Survey on the basis of geologic field examination and chemical and physical analyses, valuation data of the latter kind being obtained from the Bureau of Mines, which is charged by its organic law with the analyzing and testing of coals and lignites.

WORK OF THE YEAR.

GENERAL INCREASE.

Although the appropriations made directly for the Geological Survey showed an increase of only \$30,480 over those of 1911, there was a notable increase in the amount of work done by the field service. The funds available through cooperation with other Federal bureaus and with the States amounted in 1912 to 27 per cent of the direct appropriations and showed an increase over cooperative funds of the preceding year of 42 per cent. This increase in the field work involved a large increase in the work of the Washington office, to which was added the greatly increased service rendered the Secretary's Office, the General Land Office, and the Office of Indian Affairs in connection with public-land administration.

PUBLICATIONS.

The work done by the Survey finds public expression chiefly through its printed reports and maps, which are published in editions adapted to meet the demand. During the fiscal year ended June 30, 1912, the number of reports printed (437,501) corresponded very closely to the number distributed (437,637). The reports are sent out only on application.

The publications of the year are listed below.

THIRTY-SECOND ANNUAL REPORT of the Director of the United States Geological Survey to the Secretary of the Interior, for the fiscal year ended June 30, 1911. 1911. 151 pages, 2 plates.

A report on special features of the Survey's work, brief abstracts of publications of the year, and a summary of the work by branches and divisions, with maps showing the progress of topography and geologic surveys.

MONOGRAPH LII. The geology of the Lake Superior region, by C. R. Van Hise and C. K. Leith. 1911. 641 pages, 49 plates, 76 text figures. Price \$2.50.

An exhaustive treatise, representing the first attempt to give a connected account of the geology of this region as a whole, with special reference to the iron and copper bearing formations for which it is famous. Attention is directed primarily to general features of correlation of the formations, to the geologic history of the region, and to the origin of the iron and copper ores. The volume contains accurate maps of all the producing districts, a general geologic map of the region, diagrams, and halftone reproductions of photographs of minerals.

PROFESSIONAL PAPER 69. The earthquakes at Yakutat Bay, Alaska, in September, 1899, by R. S. Tarr and Lawrence Martin, with a preface by G. K. Gilbert. 1912. 135 pages, 33 plates, 5 text figures.

A detailed discussion of the earthquakes occurring at Yakutat Bay in 1899 and the phenomena accompanying them. As this is the first seismic disturbance that has been proved to be the direct cause of a great advance and complete breaking up of glaciers, the report will be of interest and value to scientists investigating variations in the movement of glaciers. Evidence is also

presented that the earthquakes caused notable local movements, upward or downward, of the surface of the earth. The Yakutat shock of September 10, 1899, is classed among the "world-shaking" shocks—that is, those which affect seismographs all around the earth. The book is profusely illustrated with halftone plates and diagrams of the region after the earthquakes and with seismograms of the shocks taken in different parts of the world.

PROFESSIONAL PAPER 70. The Mount McKinley region, Alaska, by A. H. Brooks, with descriptions of the igneous rocks and of the Bonfield and Kanishna districts, by L. M. Prindle. 1911. 234 pages, 18 plates, 30 text figures.

A detailed account of an exploratory journey from the Pacific seaboard through the Alaska Range along the northwest base of Mount McKinley to Tanana and Yukon rivers, with full descriptions of the stratigraphy, structure, and geologic history of the whole Mount McKinley province and a concise statement of the present knowledge of the mineral wealth of the region. Summarizes all available information concerning climate, vegetation, agricultural lands, and game. Illustrated by topographic and geologic maps, geologic sections, and halftone views.

PROFESSIONAL PAPER 73. The Tertiary gravels of the Sierra Nevada of California, by Waldemar Lindgren. 1911. 226 pages, 28 plates, 16 text figures.

This report traces a part of the history of the Sierra Nevada, the great range which, for 300 miles, divides the central valleys of California from the deserts of the Great Basin. It presents an account of the Tertiary formations of the range and deals especially with the origin and distribution of the gold-bearing gravels which made these mountains one of the treasure houses of the world. Contains detailed descriptions of the area by quadrangles. The illustrations include geologic maps and sections and halftone plates showing features of hydraulic mining.

PROFESSIONAL PAPER 75. Geology and ore deposits of the Breckenridge district, Colorado, by F. L. Ransome. 1911. 187 pages, 33 plates, 29 text figures.

This report gives the results of an investigation of one of the most important mining districts of Colorado, including descriptive and economic geology, topographic and geologic maps, and numerous halftone plates and text figures showing geologic features. The minerals of the district are listed and their characteristics noted. The important mines are described in detail, and general conclusions are drawn as to the economic future of the mining industry in this region.

BULLETIN 448. Geology and mineral resources of the Nizina district, Alaska, by F. H. Moffit and S. R. Capps. 1911. 111 pages, 12 plates, 11 text figures.

A detailed account of investigations in this part of the Chitina copper belt, including descriptive, historical, and economic geology, topographic and geologic maps, and halftone plates and text figures showing geologic features. The most important result of these investigations is the fact that the copper-ore bodies appear to occur chiefly along a system of cross fractures which are at approximately right angles to the greenstone-limestone contact. These fractures occur along well-defined faults, at least one of which has been traced for a long distance. This may apply to the entire Chitina district and is worthy of consideration by the prospector.

BULLETIN 450. Mineral resources of the Llano-Burnet region, Texas, with an account of the pre-Cambrian geology, by Sidney Paige. 1911. 103 pages, 5 plates, 22 text figures.

Deals chiefly with the geologic relations of the pre-Cambrian rocks in this region and with the associated iron ores. Contains three geologic maps.

BULLETIN 451. Reconnaissance of the ore deposits in northern Yuma County, Arizona, by Howland Bancroft. 1911. 130 pages, 8 plates, 21 text figures.

A description of the deposits and a brief geologic sketch of their formation, with views of the mining properties.

BULLETIN 454. Coal, oil, and gas of the Foxburg quadrangle, Pennsylvania, by E. W. Shaw and M. J. Munn. 1911. 85 pages, 10 plates, 15 text figures.

A discussion of the stratigraphy, structure, and mineral resources of the quadrangle, which is in the central part of Pennsylvania, about 75 miles north of Pittsburgh. Contains general and detailed descriptions of the coals, coal analyses, and descriptions by townships of the oil and gas pools. Illustrated by well and coal sections and geologic maps.

BULLETIN 455. Copper deposits of the Appalachian States, by W. H. Weed. 1911. 166 pages, 6 plates, 32 text figures.

A report on the occurrence of copper in the Appalachian region and in the Atlantic coast States, including a discussion of the types of copper deposits. All important mines are described in detail, by States. The report is illustrated by text figures showing the workings of many of the mines, by plates showing specimens of ores, and by diagrams indicating geologic structure.

BULLETIN 456. Oil and gas fields of the Carnegie quadrangle, Pennsylvania, by M. J. Munn. 1911. 99 pages, 5 plates, 2 text figures.

A report on the stratigraphy and structure of the region, with special reference to the origin of the oil and gas and the general position of the pools in each producing sand. The oil and gas fields are described in detail by townships. Sketch maps and sections of wells in the region illustrate the report.

BULLETIN 458. Results of spirit leveling in Arkansas, Louisiana, and Mississippi, 1896 to 1909, inclusive—R. B. Marshall, chief geographer. 1911. 79 pages, 1 plate.

BULLETIN 464. Results of spirit leveling in New Mexico, 1902 to 1909, inclusive—R. B. Marshall, chief geographer. 1911. 53 pages, 1 plate.

Reports on precise and primary leveling in the States indicated in the titles, showing the altitude above sea level of a great number of places. In Louisiana and Mississippi the work during part of the time was done in cooperation with the respective States. Each of these bulletins contains a halftone illustration, showing designs for bench marks used by the United States Geological Survey.

BULLETIN 466. Retracement of the boundary line between Idaho and Washington from the junction of Snake and Clearwater rivers northward to the international boundary—R. B. Marshall, chief geographer. 1911. 39 pages, 7 plates, 1 text figure.

A report on the resurvey of part of the Idaho-Washington boundary line, including an account of the original survey and descriptions of operations and mileposts. Contains a lithographed map of the boundary line.

BULLETIN 467. Geology and mineral resources of parts of the Alaska Peninsula, by W. W. Atwood. 1911. 137 pages, 14 plates, 18 text figures.

Results of an investigation of the Chignik, Herendeen Bay, and Unga coal fields, including some information, collected incidentally, in regard to the general geology and mineral resources of the entire peninsula. Accompanied by accurate detailed maps of the surveyed fields and halftone plates showing geographic and geologic features of the region.

BULLETIN 468. Results of spirit leveling in Texas, 1896 to 1910, inclusive—R. B. Marshall, chief geographer. 1911. 133 pages, 1 plate.

BULLETIN 469. Results of spirit leveling in North Dakota, 1897 to 1910, inclusive—R. B. Marshall, chief geographer. 1911. 23 pages, 1 plate.

Reports on precise and primary leveling in the States indicated in the titles, showing the altitude above sea level of a great number of places. Each of these bulletins contains a halftone illustration showing designs for bench marks used by the United States Geological Survey.

BULLETIN 470. Contributions to economic geology (short papers and preliminary reports), 1910, Part I, Metals and nonmetals except fuels—C. W. Hayes and Waldemar Lindgren, geologists in charge. 1911. 558 pages, 17 plates, 64 text figures.

Composed of 28 brief reports on investigations of mineral deposits, except fuels, made in the United States in 1910. These papers are only such as have a direct economic bearing, all topics of purely scientific interest being excluded. They have been grouped according to the subjects treated, and each group has been issued as an advance chapter as soon as it was ready. A complete list of the papers included in the report follows:

The auriferous gravels of the Trinity River basin, Cal., by J. S. Diller.

The economic geology of Carson camp, Hinsdale County, Colo., by E. S. Larsen.

Geology and mineralization of the upper St. Joe River basin, Idaho, by J. T. Pardee.

Gold-bearing ground moraine in northwestern Montana, by F. C. Schrader.
Geologic relation of ore deposits in the Elkhorn Mountains, Mont., by R. W. Stone.

Notes on the economic geology of the Ramsey, Talapoosa, and White Horse mining districts, in Lyon and Washoe counties, Nev., by J. M. Hill.

The ore deposits near Pinos Altos, N. Mex., by Sidney Paige.

Survey publications on gold and silver.

Metalliferous ore deposits near the Burro Mountains, Grant County, N. Mex., by Sidney Paige.

Preliminary report on the mineral deposits of Ducktown, Tenn., by W. H. Emmons and F. B. Laney.

Survey publications on copper.

Notes on lead and copper deposits in the Bear River Range, Idaho and Utah, by R. W. Richards.

Lead and zinc deposits in the Metaline mining district, northwestern Washington, by Howland Bancroft.

Survey publications on lead and zinc.

The arsenic deposits at Brinton, Va., by F. L. Hess.

Survey publications on antimony, chromium, monazite, nickel, platinum, quicksilver, tin, tungsten, uranium, vanadium, etc.

Iron ores in the Montevallo-Columbiana region, Alabama, by Charles Butts.

Survey publications on iron and manganese ores.

Survey publications on aluminum ores—bauxite, cryolite, etc.

Survey publications on asphalt.

Variegated marble southeast of Calera, Shelby County, Ala., by Charles Butts.

Supplementary notes on the commercial granites of Massachusetts, by T. N. Dale.

Survey publications on building stone and road metal.

Survey publications on cement and concrete materials.

Clay near Calhan, El Paso County, Colo., by G. B. Richardson.

Clay resources of the Murphysboro quadrangle, Illinois, by E. W. Shaw.

Notes on some clays from Texas, by Alexander Deussen.

Survey publications on clays, fuller's earth, etc.

Gypsum deposits in Eagle County, Colo., by E. F. Burchard.

Survey publications on gypsum and plasters.

Survey publications on lime and magnesite.

Survey publications on glass sand and glass-making materials.

Survey publications on abrasive materials.

Preliminary report on a portion of the Idaho phosphate reserve, by R. W. Richards and G. R. Mansfield.

Rock phosphate near Melrose, Mont., by H. S. Gale.

A reconnaissance of the phosphate deposits in western Wyoming, by Elliot Blackwelder.

Survey publications on phosphates and other mineral fertilizers.

Paint shales of Pennsylvania, by B. L. Miller.

Survey publications on mineral paints.

Survey publications on salines, including salt, borax, and soda.

Sulphur deposits near Soda Springs, Idaho, by R. W. Richards and J. H. Bridges.

Survey publications on sulphur and pyrite.

The types, modes of occurrence, and important deposits of asbestos in the United States, by J. S. Diller.

Dolomite for flux in the vicinity of Montevallo, Shelby County, Ala., by Charles Butts.

Graphite near Dillon, Mont., by A. N. Winchell.

Fluorspar near Deming, N. Mex., by N. H. Darton and E. F. Burchard.

Survey publications on miscellaneous nonmetallic products—asbestos, barite, feldspar, fluorspar, graphite, mica, quartz, etc.

BULLETIN 471. Contributions to economic geology (short papers and preliminary reports), 1910, Part II, Mineral fuels; advance chapters as follows:

Bulletin 471—A. Petroleum and natural gas. 1911. 182 pages, 10 plates, 2 text figures. Contains the following papers:

The Campton oil pool, Kentucky, by M. J. Munn.

Oil and gas development in Knox County, Ky., by M. J. Munn.

The Fayette gas field, Alabama, by M. J. Munn.

The Powder River oil field, Wyoming, by C. H. Wegemann.

Geology of the San Juan oil field, Utah, by E. G. Woodruff.

Marsh gas along Grand River near Moab, Utah, by E. G. Woodruff.

Notes on the geology and possible oil resources of the south end of the San Joaquin Valley, Cal., by Robert Anderson.

Bulletin 471-B. Coal on Dan River, N. C., by R. W. Stone. 1912. 35 pages, 1 plate, 4 text figures.

Report on an examination of all coal exposures in the Dan River district, leading to the conclusion that no commercially valuable coal beds exist there.

Bulletin 471-C. Lignite in the Fort Berthold Indian Reservation, N. Dak., north of Missouri River, by M. A. Pishel. 1912. 19 pages, 2 plates.

A brief report on the lignite beds of this district, estimated to contain 1,819,953,682 tons of available fuel.

Bulletin 471-E. Coal fields in Montana. 1912. 66 pages, 3 plates. Contains the following papers:

The southern extension of the Milk River coal field, Chouteau County, Mont., by L. J. Pepperberg.

The Livingston and Trail Creek coal fields, Park, Gallatin, and Sweet grass counties, Mont., by W. R. Calvert.

The Electric coal field, Park County, Mont., by W. R. Calvert.

BULLETIN 472. Results of spirit leveling in South Dakota, 1896 to 1910, inclusive—R. B. Marshall, chief geographer. 1911. 54 pages, 1 plate.

BULLETIN 473. Results of spirit leveling in Kansas and Nebraska, 1896 to 1909, inclusive—R. B. Marshall, chief geographer. 1911. 42 pages, 1 plate.

Reports on precise and primary leveling in the States indicated in the titles, showing the altitude above sea level of a great number of places. Each of these bulletins contains a halftone illustration showing designs for bench marks used by the United States Geological Survey.

BULLETIN 474. Coals of the State of Washington, by E. E. Smith. 1911. 200 pages, 8 plates.

A discussion of the character and quality of the coals of the State, giving analyses, methods of sampling, and detailed descriptions, by counties, of the mines and coals. A map of a portion of western Washington, showing the distribution of coal mines and prospects, and halftone plates illustrate the bulletin.

BULLETIN 475. The diffusion of crude petroleum through fuller's earth, with notes on its geologic significance, by J. E. Gilpin and O. E. Bransky. 1911. 50 pages, 7 text figures.

An account of experiments in which crude Illinois petroleum was allowed to diffuse upward through fuller's earth. These experiments were similar to those discussed in Bulletin 365 and confirmed the results of the earlier work. One object was to obtain further light as to the variations among the oils of this country.

BULLETIN 476. Results of spirit leveling in Ohio, 1909 and 1910—R. B. Marshall, chief geographer. 1911. 79 pages, 1 plate.

A report on precise and primary leveling in Ohio, showing the altitude above sea level of a great number of places. The work was done in cooperation with the State. The bulletin contains a halftone illustration showing designs for bench marks used by the United States Geological Survey.

BULLETIN 477. Results of spirit leveling in West Virginia, 1909 and 1910—R. B. Marshall, chief geographer. 1911. 54 pages, 1 plate.

A supplement to Bulletin 399, showing the altitude above mean sea level of more than 900 places determined by precise leveling of the Geological Survey and the Coast and Geodetic Survey and by primary leveling of the Geological Survey. The work was done in cooperation with the State. The bulletin contains a halftone illustration showing Geological Survey bench marks.

BULLETIN 478. Geology and ore deposits near Lake City, Colo., by J. D. Irving and Howland Bancroft. 1911. 128 pages, 8 plates, 33 text figures.

Discusses the geology of the San Juan Mountains and the Lake City district and gives a brief history of their mineral industry and detailed descriptions of their ore deposits and mines. The illustrations include topographic and geologic maps and diagrams of the veins and workings.

BULLETIN 479. The geochemical interpretation of water analyses, by Chase Palmer. 1911. 31 pages, 1 text figure.

An exposition of the principle that natural water may be definitely characterized if the salts dissolved in it are recognized not as a load, but as a chemical system of balanced values. The relation of silica to primary alkalinity and the persistence of silica in river waters are among the topics considered.

BULLETIN 480. Mineral resources of Alaska—report on progress of investigations in 1910, by A. H. Brooks and others. 1911. 333 pages, 13 plates, 19 text figures.

This bulletin includes the following papers:

Administrative report, by A. H. Brooks.

Report on progress of surveys of public lands in Alaska during 1910, by A. H. Brooks.

The mining industry in 1910, by A. H. Brooks.

Geologic features of Alaskan metalliferous lodes, by A. H. Brooks.

Mining in southeastern Alaska, by Adolph Knopf.

The Eagle River region, by Adolph Knopf.

The upper Susitna and Chistochina districts, by F. H. Moffit.

Preliminary report on a detailed survey of part of the Matanuska coal fields, by G. C. Martin.

A reconnaissance of the Willow Creek gold region, by F. J. Katz.

Placer mining in the Yukon-Tanana region, by C. E. Ellsworth and G. L. Parker.

Mineral resources of the Bonfield region, by S. R. Capps.

Gold placer mining developments in the Innoko-Iditarod region, by A. G. Maddren.

The Shungnak region, Kobuk Valley, by P. S. Smith and H. M. Eakin.

The Squirrel River placers, by P. S. Smith.

BULLETIN 481. Results of spirit leveling in California, 1907 to 1910, inclusive—R. B. Marshall, chief geographer. 1911. 115 pages, 1 plate.

BULLETIN 482. Results of spirit leveling in Montana, 1896 to 1910, inclusive—R. B. Marshall, chief geographer. 1911. 154 pages, 1 plate.

Reports on precise and primary leveling in California and Montana, respectively, showing the altitude above sea level of a great number of places in each State. The work in Sacramento, Salinas, and San Joaquin valleys, Cal., was done in cooperation with the State. Each bulletin contains a halftone illustration showing designs for bench marks used by the United States Geological Survey.

BULLETIN 483. Economic geology of Richmond, Va., and vicinity, by N. H. Darton. 1911. 47 pages, 10 plates, 1 text figure.

Describes the rocks of Richmond and vicinity, with special reference to the high-grade granite and brick clays. Accompanied by a map showing the economic geology of the district and halftone plates illustrating the working of the quarries and clay deposits.

- BULLETIN 484.** The granites of Connecticut, by T. N. Dale and H. E. Gregory. 1911. 137 pages, 7 plates, 12 text figures.

Treats of Connecticut granites both scientifically and economically, classifying them, giving statistics of production, and describing the quarries and their product in detail. The illustrations consist of halftone plates showing some of the uses made of the granites and maps and sections of the quarries.

- BULLETIN 485.** A geologic reconnaissance of the Illamna region, Alaska, by G. C. Martin and F. J. Katz. 1912. 136 pages, 9 plates, 20 text figures.

A sketch of the stratigraphic and structural geology of a recently surveyed district situated in southwestern Alaska, west of the southern half of Cook Inlet and north of the Alaska Peninsula. Special mention is made of the mode of occurrence of the copper lodes and auriferous quartz veins, and the few claims and prospects now in existence are briefly discussed. The report contains tables showing the sequence and character of rocks in different parts of the region and the correlation of formations in western and southwestern Alaska, topographic and geologic maps, and structure sections.

- BULLETIN 486.** Results of spirit leveling in Colorado, 1896 to 1909, inclusive—R. B. Marshall, chief geographer. 1911. 107 pages, 1 plate.

- BULLETIN 487.** Results of spirit leveling in Idaho, 1896 to 1909, inclusive—R. B. Marshall, chief geographer. 1911. 46 pages, 1 plate.

- BULLETIN 488.** Results of spirit leveling in Nevada, 1897 to 1909, inclusive—R. B. Marshall, chief geographer. 1911. 28 pages, 1 plate.

- BULLETIN 489.** Results of spirit leveling in Utah, 1897 to 1910, inclusive—R. B. Marshall, chief geographer. 1911. 38 pages, 1 plate.

Reports on precise and primary leveling in the States indicated in the titles, showing the altitude above sea level of a great number of places. Each of these bulletins contains a halftone illustration showing designs for bench marks used by the United States Geological Survey.

- BULLETIN 490.** Mineralogical notes—series 1, by W. T. Schaller. 1911. 109 pages, 14 text figures.

Results of researches in mineralogy in the chemical laboratory of the United States Geological Survey from 1905 to 1909. Describes many new minerals and contains text figures showing their crystal forms.

- BULLETIN 491.** The data of geochemistry (second edition), by F. W. Clarke. 1911. 782 pages.

A manual of geologic chemistry, including chapters on the nature, distribution, and relative abundance of the chemical elements, the composition of the atmosphere and of volcanic gases and sublimates, the mineral content of surface and underground waters, the nature of saline residues, the molten magma of the earth's interior, the rock-forming minerals, the composition of igneous, sedimentary, and metamorphic rocks, rock metamorphism and decomposition, metallic ores, natural hydrocarbons, coal, lignite, and peat.

- BULLETIN 492.** The gabbros and associated rocks at Preston, Conn., by G. F. Loughlin. 1912. 158 pages, 14 plates, 18 text figures.

A detailed description of the areal and structural geology in the vicinity of Preston, with especial reference to the petrography of the gabbros and other igneous rocks. The illustrations consist of photomicrographs of the rocks and maps showing the location of outcrops and the geology of the district.

BULLETIN 493. Results of spirit leveling in Illinois, 1909 and 1910—R. B. Marshall, chief geographer. 1911. 115 pages, 1 plate.

A report on precise and primary leveling, showing the altitude above sea level of more than 1,300 places. Contains a halftone illustration showing designs for bench marks used by the United States Geological Survey.

BULLETIN 494. The New Madrid earthquake, by, M. L. Fuller. 1912. 119 pages, 10 plates, 18 text figures.

A systematic discussion of the phenomena accompanying the shocks of the earthquake at New Madrid, Mo., in 1811-12, which may be regarded as a type, exhibiting in unusual detail the geologic effects of great disturbances upon unconsolidated deposits. The illustrations include maps, diagrams, and halftone plates.

BULLETIN 495. Bibliography of North American geology for 1910, with subject index, by J. M. Nickles. 1911. 179 pages.

A list of papers published in 1910 on North American geology, arranged alphabetically by names of authors, an index of subjects or materials, and lists showing chemical analyses reported and minerals, rocks, and formations described.

BULLETIN 496. Results of triangulation and primary traverse for the years 1909 and 1910—R. B. Marshall, chief geographer. 1912. 392 pages, 2 plates.

Gives the results of triangulation and primary traverse in the United States for the years 1909 and 1910, listing 428 triangulation stations and 6,903 primary traverse stations, nearly all on United States standard datum. Includes a map showing the condition of astronomic location and primary control to January 1, 1911, and a halftone plate showing Geological Survey station marks.

BULLETIN 497. A reconnaissance of the Jarbidge, Contact, and Elk Mountain mining districts, Elko County, Nevada, by F. C. Schrader. 1912. 162 pages, 26 plates, 3 text figures.

A sketch of the geology of this promising mining region, surveyed for the first time in the summer of 1910, with descriptions of mines and prospects and a discussion of the mineral deposits. The illustrations include geologic reconnaissance maps, maps showing surveyed claims, and halftone plates of mineral specimens.

BULLETIN 499. Coal near the Black Hills, Wyoming-South Dakota, by R. W. Stone. 1912. 66 pages, 7 plates, 8 text figures.

Gives the results of two field examinations of all known coal exposures near the Black Hills and includes all information previously published by the United States Geological Survey on this subject. The geology of the district is briefly discussed and the coal localities are treated separately and in detail. The illustrations include sketch maps of mines and prospects and sections of coal beds.

BULLETIN 500. Geology and coal fields of the lower Matanuska Valley, Alaska, by G. C. Martin and F. J. Katz. 1912. 98 pages, 19 plates, 12 text figures.

Describes the geology of an important coal-bearing region of Alaska, surveyed in detail in the summer of 1910, discusses the character and accessibility of its coal beds, and gives sections of many of these beds. Topographic and geologic maps and halftone plates showing geologic features make up the illustrations.

BULLETIN 504. The Sitka mining district, Alaska, by Adolph Knopf. 1911. 82 pages, 1 plate, 4 text figures.

A sketch of the geology of the Sitka mining district, comprising Chichagof, Baranof, Kruzof, and a few smaller islands, with especial reference to the mineral resources of the west coast. After 10 years' stagnation in the mining industry of this district, interest has been revived by the discovery and prosperous development of high-grade gold ore at Klag Bay, 50 miles north of Sitka. A geologic reconnaissance map of the Sitka and Juneau mining districts accompanies the report.

BULLETIN 505. Mining laws of Australia and New Zealand, by A. C. Veatch, with a preface by Walter L. Fisher, Secretary of the Interior. 1911. 180 pages.

A summary of the underlying principles, development, and practical workings of the mining laws of Australia, Tasmania, and New Zealand, investigated by Mr. Veatch in 1907-8 by order of the President. Reprinted from report of the joint committee of Congress to investigate the Department of the Interior and the Bureau of Forestry.

BULLETIN 506. Geology and mineral resources of the Peoria quadrangle, Illinois, by J. A. Udden. 1912. 103 pages, 9 plates, 16 text figures.

A study of the geology of the Peoria quadrangle with especial reference to its coal deposits. In this quadrangle are situated the manufacturing cities of Peoria and Pekin, whose growth has been enhanced by their proximity to workable coal beds. The bulletin includes a chapter on the water resources of the district and is illustrated by geologic maps, halftone views of coal mines, and sections and diagrams of coal exposures.

BULLETIN 507. The mining districts of the western United States, by J. M. Hill, with a geologic introduction by Waldemar Lindgren. 1912. 309 pages, 16 plates, 1 text figure.

A catalogue, by States and counties, of the mining districts of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Texas* (western part), Utah, Washington, and Wyoming, with a section on the local geology of their ore deposits. The book contains a map of each State showing the location of its mining districts and an alphabetic index of all the districts.

BULLETIN 509. Mineralogical notes—series 2, by W. T. Schaller. 1912. 115 pages, 1 plate, 5 text figures.

A continuation of Bulletin 490, giving results of researches in mineralogy in the chemical laboratory of the United States Geological Survey from January, 1910, to June, 1911. Many new and rare minerals are discussed.

BULLETIN 511. Alunite, a newly discovered deposit near Marysville, Utah, by B. S. Butler and H. S. Gale. 1912. 64 pages, 3 plates.

An account of the discovery of alunite near Marysville, Utah, and the development of the deposit as an important source of potash. The known occurrences of alunite both in the United States and elsewhere are mentioned and its commercial availability is discussed.

BULLETIN 512. Potash-bearing rocks of the Leucite Hills, Sweetwater County, Wyoming, by A. R. Schultz and Whitman Cross. 1912. 1 plate, 9 text figures.

Describes briefly the rocks in the Leucite Hills, Wyoming, and estimates the amount of leucite-bearing rock available and the approximate amount of

potash that these rocks may yield as soon as a process is discovered by which the potash can be dissociated from the rock cheaply enough for commercial use.

BULLETIN 520. Mineral resources of Alaska, 1911; advance chapters as follows:

Bulletin 520-B. Tin resources of Alaska, by F. L. Hess. 1912. 6 pages.

Bulletin 520-K. Geologic investigations along the Canada-Alaska boundary, by A. G. Maddren. 1912. 20 pages.

Bulletin 520-M. Notes on mining in Seward Peninsula, Alaska, by P. S. Smith. 1912. 8 pages.

BULLETIN 530. Contributions to economic geology (short papers and preliminary reports), 1911, Part I, Metals and nonmetals except fuels; advance chapters as follows:

Bulletin 530-A. The search for potash in the United States: A report of progress, by H. S. Gale. 1911. 27 pages, 1 plate, 1 text figure.

Bulletin 530-B. The occurrence of potash salts in the bitterns of the eastern United States, by W. C. Phalen. 1911. 18 pages.

These papers deal with experiments now in progress in the search for potash in the United States, with the purpose of developing a home industry and reducing the importation from Germany. Chapter A tells of experiments in well drilling in Nevada, and chapter B gives results of a systematic study of the brines, bitterns, and rock-salt deposits east of the Rocky Mountains. As yet potash in commercial quantities has not been discovered, but the information collected seems to warrant further investigation.

Bulletin 530-C. The Turquoise copper-mining district, Arizona, by F. L. Ransome. 1912. 12 pages, 2 text figures.

Bulletin 530-D. Notes on the gold lodes of the Carrville district, Trinity County, Cal., by D. F. MacDonald. 1912. 37 pages, 1 plate, 9 text figures.

Bulletin 530-F. Alunite in the San Cristobal quadrangle, Colo., by E. S. Larsen. 1912. 7 pages.

Bulletin 530-G. Gold and silver in Idaho. 1912. 23 pages, 1 plate, 1 text figure. Contains:

A preliminary account of the ore deposits of the Loon Creek district, Idaho, by J. B. Umpleby.

Geology of the St. Joe-Clearwater region, Idaho, by F. C. Calkins and E. L. Jones, jr.

Bulletin 530-I. Notes on the clays of Delaware, by G. C. Matson; Clay in the Portland region, Maine, by F. J. Katz. 1912. 24 pages, 1 text figure.

Bulletin 530-J. Notes on the Antelope district, Nevada, by F. C. Schrader. 1912. 14 pages, 1 plate, 1 text figure.

Bulletin 530-L. Graphite near Raton, N. Mex., by W. T. Lee; Mica in Idaho, New Mexico, and Colorado, by D. B. Sterrett. 1912. 22 pages, 3 text figures.

Bulletin 530-M. Notes on the northern La Sal Mountains, Grand County, Utah, by J. M. Hill. 1912. 22 pages, 1 text figure.

Bulletin 530-N. Gypsum in Utah and Virginia. 1912. 37 pages, 1 plate, 5 text figures. Contains:

Gypsum along the west flank of the San Rafael Swell, Utah, by C. T. Lupton. Geology of the salt and gypsum deposits of southwestern Virginia, by G. W. Stose.

Bulletin 530—O. Sulphur in Utah, Wyoming, and Colorado. 1912. 25 pages, 1 plate, 1 text figure. Contains:

A sulphur deposit in the San Rafael Canyon, Utah, by F. L. Hess.

Sulphur deposits of Sunlight Basin, Wyoming, by D. F. Hewett.

Two sulphur deposits in Mineral County, Colo., by E. S. Larsen and J. F. Hunter.

Bulletin 530—P. Zirconiferous sandstone near Ashland, Va., by T. L. Watson and F. L. Hess. 1912. 9 pages.

WATER-SUPPLY PAPERS 261, 266, 267, 268, 269, 271, 272. Parts of "Surface water supply of the United States, 1909," prepared under the direction of M. O. Leighton:

Part I. Water-Supply Paper 261. North Atlantic coast, by H. K. Barrows, C. C. Covert, and R. H. Bolster. 1911. 309 pages, 5 plates, 1 text figure.

Part VI. Water-Supply Paper 266. Missouri River basin, by W. A. Lamb, W. B. Freeman, and F. F. Henshaw. 1911. 291 pages, 5 plates, 1 text figure.

Part VII. Water-Supply Paper 267. Lower Mississippi basin, by W. B. Freeman and R. H. Bolster. 1911. 99 pages, 2 plates, 1 text figure.

Part VIII. Water-Supply Paper 268. Western Gulf of Mexico, by W. B. Freeman and R. H. Bolster. 1911. 107 pages, 6 plates.

Part IX. Water-Supply Paper 269. Colorado River basin, by W. B. Freeman and R. H. Bolster. 1911. 247 pages, 9 plates, 1 text figure.

Part XI. Water-Supply Paper 271. California, by W. B. Clapp and F. F. Henshaw. 1911. 256 pages, 6 plates, 1 text figure.

Part XII. Water-Supply Paper 272. North Pacific coast, by J. C. Stevens, E. C. La Rue, and F. F. Henshaw. 1911. 521 pages, 8 plates.

These reports contain descriptions of the drainage basins named and the results of stream measurements in them, namely, gage-height records, results of current-meter measurements, and daily and monthly discharges. Illustrations showing typical gaging stations, current meters, and rating curves accompany each book.

WATER-SUPPLY PAPER 273. Quality of the water supplies of Kansas, by H. N. Parker, with a preliminary report on stream pollution by mine waters in southeastern Kansas, by E. H. S. Bailey. 1911. 375 pages, 1 plate, 1 text figure.

Presents the results of an investigation, conducted in cooperation with the Kansas State Board of Health, to determine the quality of the water supplies of the State. Describes briefly the salient geologic features in order that their relation to the water supply may be understood and contains 190 tables giving analyses and assays of the different waters. The underground sources are discussed separately by counties and the surface streams by river basins.

WATER-SUPPLY PAPER 274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pages.

A report setting forth the results of a systematic study of the waters likely to be utilized on the Reclamation Service projects. This study was made in order to determine the influence of the salinity of the waters on the growth of vegetation and the effect of suspended matter in silting canals and reservoirs. Contains tables giving analyses, gage heights, rates of discharge, and relative amounts of substances in solution in the waters of different rivers.

WATER-SUPPLY PAPER 275. Geology and water resources of Estancia Valley, N. Mex., with notes on ground-water conditions in adjacent parts of central New Mexico, by O. E. Meinzer. 1911. 89 pages, 14 plates, 7 text figures.

Describes the physiography, geology, soils, and climate of this valley, which, although for a long time sparsely settled, has only recently become accessible by railroads. Gives special attention to the water of the valley, discussing its source and disposal, head, recovery, and quality, and the proper mode of irrigation. Illustrations showing geologic and hydrographic features accompany the report.

WATER-SUPPLY PAPER 276. Geology and underground waters of northeastern Texas, by C. H. Gordon. 1911. 78 pages, 2 plates, 6 text figures.

An account of the geology of the region, both descriptive and historical, with special reference to its effect on the character and distribution of underground waters. The geography, geology, and water resources are treated by counties. Sections of several deep wells are given.

WATER-SUPPLY PAPER 277. Ground waters in Juab, Millard, and Iron counties, Utah, by O. E. Meinzer. 1911. 158 pages, 5 plates, 13 text figures.

A report on the water resources of an important section of central Utah, including a discussion of rainfall, soil, vegetation, streams, and industrial development. The occurrence of ground water is described and its quality considered. Its availability for irrigation, culinary supplies, and boiler supplies are given special attention. Watering places on routes of travel in the vicinity of the Sevier Desert are listed, and the report concludes with detailed descriptions of the water resources of the region.

WATER-SUPPLY PAPER 278. Water resources of the Antelope Valley, California, by H. R. Johnson. 1911. 92 pages, 7 plates, 11 text figures.

Sketches the drainage, climate, and geologic features of the valley, with especial reference to the water-bearing rocks. Describes the water resources and their economic development in detail and gives tables of data concerning individual wells.

WATER-SUPPLY PAPER 279. Water resources of the Penobscot River basin, Maine, by H. K. Barrows and C. C. Babb. 1912. 285 pages, 19 plates, 5 text figures.

Compiled chiefly from the records, reports, and maps of the United States Geological Survey and from the results of surveys made in cooperation with the Maine State Survey Commission. The report includes all data on precipitation, stream flow, water storage, and water power that were available at the end of the calendar year 1909 and is accompanied by plans and profiles of the principal rivers, lakes, and ponds in the basin. It contains also a gazetteer of the water features in the Penobscot basin, by G. E. Schulz.

WATER-SUPPLY PAPER 280. Gaging stations maintained by the United States Geological Survey, 1888-1910, and Survey publications relating to water resources, compiled by B. D. Wood. 1912. 102 pages.

Includes a complete list of the Survey gaging stations on streams in the United States and a list of all reports on water resources published by the United States Geological Survey, arranged in the order of their publication.

WATER-SUPPLY PAPERS 282, 285, 286, 287, 288. Parts of "Surface water supply of the United States, 1910," prepared under the direction of M. O. Leighton:

Part II. Water-Supply Paper 282. South Atlantic coast and eastern Gulf of Mexico, by M. R. Hall and J. G. Mathers. 1912. 109 pages, 3 plates.

Part V. Water-Supply Paper 285. Hudson Bay and upper Mississippi River, by Robert Follansbee, A. H. Horton, and G. C. Stevens. 1912. 318 pages, 3 plates.

Part VI. Water-Supply Paper 286. Missouri River basin, by W. A. Lamb, W. B. Freeman, Raymond Richards, and R. C. Rice. 1911. 308 pages, 4 plates, 1 text figure.

Part VII. Water-Supply Paper 287. Lower Mississippi basin, by W. B. Freeman and J. G. Mathers. 1911. 91 pages, 2 plates.

Part VIII. Water-Supply Paper 288. Western Gulf of Mexico, by W. B. Freeman and J. G. Mathers. 1911. 149 pages, 3 plates, 1 text figure.

These reports contain descriptions of the drainage basins named and the results of stream measurements in them, namely, gage-height records, results of current-meter measurements, and daily and monthly discharges. Illustrations showing typical gaging stations, current meters, and rating curves accompany each book.

WATER-SUPPLY PAPER 295. Gazetteer of surface waters of California, Part I, Sacramento River basin, prepared under the direction of J. C. Hoyt by B. D. Wood. 1912. 97 pages.

The first of a series of reports on the surface waters of California, prepared by the United States Geological Survey under cooperative agreement with the State of California as represented by the State Conservation Commission and the State Board of Control (Water Powers). Every stream and gaging station in the Sacramento River basin is listed in this paper.

MINERAL RESOURCES OF THE UNITED STATES, calendar year 1909. Part I. Metals: 617 pages, 1 plate, 4 text figures. Part II. Nonmetals; 942 pages, 6 text figures.

MINERAL RESOURCES OF THE UNITED STATES, calendar year 1910. Part I. Metals; 796 pages, 1 plate, 9 text figures. Part II. Nonmetals, 1,005 pages, 17 plates, 10 text figures. 1911.

Statistics of production of mineral substances in the United States, including accounts of the chief features of mining progress and comparisons of past and present production and conditions. The report for 1909 is a consolidation of 53 advance chapters, that for 1910 of 51, each of which covers a single mining industry or group of allied industries.

MINERAL RESOURCES OF THE UNITED STATES, calendar year 1911; advance chapters as follows:

Iron-ore reserves of Michigan, by C. K. Leith. 1912. 18 pages, 1 text figure.

The production of talc and soapstone, by J. S. Diller. 1912. 9 pages.

The production of bauxite and aluminum, by W. C. Phalen. 1912. 19 pages, 1 text figure.

The production of asbestos, by J. S. Diller. 1912. 9 pages.

Potash salts, summary for 1911, by W. C. Phalen. 1912. 31 pages.

The production of graphite, by E. S. Bastin. 1912. 38 pages, 3 text figures.

The production of slate, by A. T. Coons. 1912. 19 pages.

- The production of sand-lime brick. 1912. 5 pages.
- The production of mica, by D. B. Sterrett. 1912. 9 pages.
- The production of monazite and zircon, by D. B. Sterrett. 6 pages.
- Sulphur, pyrite, and sulphuric acid, by W. C. Phalen, with notes on the manufacture of sulphuric acid from smelter fumes at Ducktown, Tenn., by F. B. Laney. 1912. 30 pages.
- The production of phosphate rock, by F. B. Van Horn. 1912. 14 pages.
- The production of fuller's earth, by Jefferson Middleton. 1912. 7 pages.
- Statistics of the pottery industry in the United States, by Jefferson Middleton. 1912. 11 pages.
- Quicksilver—production and resources, by H. D. McCaskey. 1912. 35 pages.
- The production of asphalt, related bitumens, and bituminous rock, by D. T. Day. 1912. 21 pages.
- The production of abrasive materials, by W. C. Phalen. 1912. 22 pages.
- Gold, silver, copper, lead, and zinc in the Eastern States (mine production), by H. D. McCaskey. 1912. 18 pages.
- The gypsum industry, by E. F. Burchard. 1912. 8 pages.
- The production of chromic iron ore, by W. C. Phalen. 1912. 10 pages.

GEOLOGIC FOLIO 178. Description and maps of the Foxburg and Clarion quadrangles, comprising 450 square miles in western Pennsylvania, northeast of Pittsburgh, by E. W. Shaw, E. F. Lines, and M. J. Munn. 1911. 17 folio pages of text, 8 maps, 1 columnar-section sheet, 1 well-section sheet, 12 text figures. Published also in octavo form, 127 pages; maps in pocket.

GEOLOGIC FOLIO 179. Description and maps of the Pawpaw and Hancock quadrangles, comprising 460 square miles in eastern West Virginia, western Maryland, and southern Pennsylvania, by G. W. Stose and C. K. Swartz. 1912. 24 folio pages of text, 4 maps, 2 structure-section sheets, 1 columnar-section sheet, 20 halftone plates, 11 text figures, and a table of formation names and equivalents. Published also in octavo form, 176 pages; maps in pocket.

GEOLOGIC FOLIO 180. Description and maps of the Claysville quadrangle, comprising 228 square miles in Greene and Washington counties, Pennsylvania, by M. J. Munn. 1912. 14 folio pages of text, 4 maps, 1 columnar-section sheet, 1 well-section sheet, 10 text figures. Published also in octavo form, 98 pages; maps in pocket.

GEOLOGIC FOLIO 181. Description and maps of the Bismarck quadrangle, comprising 820 square miles in central North Dakota, by A. G. Leonard. 1912. 8 folio pages of text, 2 maps, 1 text figure. To be published also in octavo form.

GEOLOGIC FOLIO 182. Description and maps of the Choptank quadrangle, comprising 831.51 square miles in Anne Arundel, Kent, Queen Annes, Talbot, Caroline, and Dorchester counties, Maryland, by B. L. Miller. 1912. 8 folio pages of text, 2 maps, 3 text figures. To be published also in octavo form.

GEOLOGIC FOLIO 183. Description and maps of the Llano and Burnet quadrangles, comprising 2,050 square miles in Llano, Burnet, Mason, San Saba, Travis, and Williamson counties, Texas, by Sidney Paige. 1912. 16 folio pages of text, 4 maps, 2 structure-section sheets, 11 plates, 6 text figures. To be published also in octavo form.

TOPOGRAPHIC MAPS as follows:

Beverly, Wash.	Keefers, Cal. ²	Oxford, Ohio.
Biggs, Cal.	Kesar Falls, Maine-N. H.	Pineville, W. Va.
Blackfoot, Mont.	Knoxville, Iowa.	Pocahontas special, Va.-
Bridgeport, Cal.-Nev.	Kosmosdale, Ky.-Ind.	W. Va.
Brighton, Cal.	Lake, Wyo. ¹	Pounding Mill, W. Va. ²
Browns Valley, Cal.	Lake Providence, La.	Prospect, Ky.-Md. ²
Butte City, Cal.	Landlow, Cal.	Quarryville, Pa.
Caldwell, Ohio.	Laurelville, Ohio.	Randsburg, Cal. ¹
Cambridge, Ohio.	Leavenworth and vicinity,	Ray, N. Dak.
Canal Dover, Ohio.	Kans.-Mo.	Ray and vicinity, Ariz.
Canton, N. Y.	Lincolnton, N. C.	Rochester, N. Y. ¹
Canyon, Wyo. ¹	Livermore, Me.	Rochester special, N. Y. ¹
Cataldo, Idaho-Mont.	Loramie, Ohio.	Rolla, Mo.
Clear Creek, Cal.	McKeever, N. Y.	Sacramento Valley, Cal.
Colorado River surveys, Cal.-	McKittrick, Cal.	Salinas Valley, Cal., sheet
Nev. (4 sheets). ²	Madison, W. Va.	No. 1. ²
Copper Mountain and vicin-	Mason, Mich.	Sallisaw, Okla. ⁴
ity, Alaska.	Meridian, Cal.	Sanborn Slough, Cal.
Creede and vicinity, Colo.	Miami copper belt, Arizona.	Sansbois, Okla. ⁴
Cumberland, Ohio.	Milledgeville, Ga.	Shoshone, Wyo. ¹
Cut Bank, Mont.	Mills, Cal.	Singer Creek, Cal.
De Beque oil field, Mont.	Minnesota (State).	Spencerville, Ohio.
Delhi, N. Y.	Mississippi (State).	Summerfield, Ohio.
Delphos, Ohio.	Montpeller, Idaho - Wyo.-	Sutter, Cal.
Dry Creek, Cal.	Utah.	Taylorville-La Grange, Ky. ²
Elizabeth, Ill.	Montrose, Colo.	Thibedau Lake, Mont.
Franklin, Pa.	Mount Goddard, Cal.	Thsdale Weir, Cal.
Gallatin, Wyo. ¹	Mount Guyot, Tenn.-N. C. ⁴	Uhrichsville, Ohio.
Gilbert, W. Va.-Va.-Ky.	Mount Jackson, Colo.	United States base map, 18
Gillsizer Slough, Cal.	Mullens, W. Va.	by 28 inches. ¹
Glacier National Park, Mont.	Muskingum County, Ohio.	United States contour map,
Gridley, Cal.	Naugatuck, W. Va. ²	18 by 28 inches. ¹
Grimes, Cal.	Nelson, Cal.	United States relief map, 18
Hamburg, Pa.	New Athens, Ill.	by 28 inches. ¹
Hammond, N. Y.	New Berlin, N. Y.	Vermont (State).
Hartwick, N. Y.	Newhard, Cal.	Welch, W. Va.
Honcut, Cal.	North America, 28 by 38	Willamette Valley, Oreg.,
Illinois (State).	inches.	sheet No. 4. ²
Ivanpah, Cal.-Nev.	Ontario Beach, N. Y. ¹	Yellowstone National Park,
Jefferson County, Ky.	Oroville, Cal. ²	Wyo.-Mont.-Idaho. ²
Kasaan Peninsula, Alaska.	Ostrom, Cal.	Yuba City, Cal.

GEOLOGIC MAP OF NORTH AMERICA, compiled by the United States Geological Survey in cooperation with the Geological Survey of Canada and the Instituto Geológico de México under the supervision of Bailey Willis and George W. Stose. Scale 1:5,000,000, or 80 miles to the inch. Printed in four parts, which together make a wall map 60 by 77 inches. Shows 42 geologic divisions.

CONVENTIONAL SIGNS: A sheet (20 by 30 inches) showing conventional signs adopted by the United States Geographic Board and recommended for use on Government maps.

¹ New edition.² Preliminary photolithograph.³ Preliminary edition showing part of quadrangle.⁴ Reengraved.⁵ Revised and enlarged.

FIELD WORK BY THE DIRECTOR.

During the season of 1911 the Director had field conferences with or visited parties in New Hampshire, Utah, Nevada, and Washington. In Utah the principal field conference was held with the chief geologist and G. F. Loughlin in connection with the revision of the survey of the Tintic mining district made in 1897. In Nevada an examination of a potash locality was made in company with H. S. Gale and A. H. Brooks. A large portion of the Director's attention was given, both in the field and in the office, to the administration of the examination by the Geological Survey of proposed national forest reservations. Three inspection visits were made to the field parties working in New Hampshire, one August 2-3, 1911, one November 12-16, 1911, and one May 24-26, 1912. Another trip was made November 10-11, 1911, for inspection of areas in Tennessee. A trip was also made to Virginia April 27-29, 1912, in company with the members of the National Forest Reservation Commission. The Director also attended meetings of the American Institute of Mining Engineers, the Geological Society of America, and the American Mining Congress, presenting at the mining congress a paper on "What the West needs in coal-land legislation."

CHANGES IN ORGANIZATION.

The only important formal change in the organization during the year was that of making the land-classification board equal in rank with the field branches. As contrasted with the three field branches of the Geological Survey, the land-classification board may be designated as the office of field records and intradepartmental correspondence on all matters relating to the classification of the public lands and the administration of the public domain. The board thus receives records and makes available all data valuable for purposes of land classification that have been or may be collected by the field service of the Geological Survey.

On October 15, 1911, Dr. C. W. Hayes, who had been a member of the Survey for 23 years and served as chief geologist since 1902, resigned in order to become vice president and manager of the Compañía Mexicana de Petróleo "El Águila." The vacancy thus created was filled by the appointment of Waldemar Lindgren, who had been a geologist of the Survey for 27 years.

GEOLOGIC BRANCH.

ADMINISTRATION.

The geologic branch embraces four divisions—(1) geology, Waldemar Lindgren in charge; (2) Alaskan mineral resources, A. H. Brooks in charge; (3) mineral resources, E. W. Parker in charge; and (4) chemical and physical research, G. F. Becker in charge.

The chief geologist has general supervision of the work of the geologic branch. C. W. Hayes resigned as chief geologist on October 15, 1911, and on November 3 Waldemar Lindgren was appointed to fill this position. The divisions composing the branch cooperate effectively in their several lines of work. Members of one division are employed in the work of another whenever it seems desirable. The statistical reports of the division of mineral resources are for the most part prepared by geologists, who are detailed from the division of geology for a portion of the year.

The land-classification board was also included in the geologic branch until May 1, 1912, when it was made a separate branch.

The administrative duties of the chief geologist prevent him from carrying on systematic field work. His work outside of the office consists chiefly of the planning of future examinations and of field conferences for determining questions of dispute.

PUBLICATIONS.

The publications of the year prepared in the geologic branch included 6 geologic folios, 2 professional papers, 24 bulletins, and the annual volumes on mineral resources. Besides these publications 101 papers were, with the permission of the Director, published in scientific journals and in the transactions of scientific societies. Such publications are ordinarily restatements of results in a more technical form and are usually prepared by members of the Survey without compensation.

The areal extent of geologic maps published by the Survey to date is shown on Plate I.

DIVISION OF GEOLOGY.

ORGANIZATION.

The scientific force at the beginning of the year consisted of 62 geologists, 57 assistant geologists, and 38 junior geologists. During the year there were 8 resignations and 1 appointment, the total being 150 at the end of the year. Of the total number, 75 were continuously employed, 34 carried on the per diem roll gave only a part of their time to Survey work, and 41 were not employed during the year. In addition to the regular force, 16 field assistants were employed for a part of the year.

The work of the division was organized under a number of sections, as follows:

Areal and structural geology, Arthur Keith in charge.

Paleontology and stratigraphic geology, T. W. Stanton in charge.

Economic geology, metalliferous ores, Waldemar Lindgren in charge.

Economic geology, nonmetalliferous minerals, F. B. Van Horn in charge.

Economic geology, fuels, M. R. Campbell in charge.

The section chiefs have direct supervision, both in the field and in the office, of the work in their sections and are directly responsible for maintaining efficiency and a high scientific standard.

The following changes were ordered in the arrangement of sections in the division of geology and paleontology, effective July 1, 1912:

1. Section of eastern areal and structural geology (east of the one hundredth meridian), Arthur Keith in charge. Subsection: Investigation of the geology of the Coastal Plain, T. W. Vaughan in charge.
2. Section of western areal and structural geology (west of the one hundredth meridian), F. L. Ransome in charge. Subsection: Investigations and work relating to petrography, E. S. Larsen in charge.
3. Section of glacial geology, W. C. Alden in charge.
4. Section of paleontology and stratigraphic geology, T. W. Stanton in charge.
5. Section of economic geology, metalliferous deposits, Waldemar Lindgren in charge.
6. Section of economic geology, nonmetalliferous deposits, H. S. Gale in charge.
7. Section of economic geology, eastern mineral fuels (east of the one hundredth meridian), David White in charge.
8. Section of economic geology, western mineral fuels (west of the one hundredth meridian), M. R. Campbell in charge.

ALLOTMENTS.

The total appropriations for geologic surveys for the fiscal year 1911-12 were:

Geologic surveys.....	\$300,000
Statutory salaries.....	15,700
Search for potash deposits (part of appropriation for chemistry and physics).....	20,000
	335,700

The allotments of the appropriations were as follows:

Section of areal and structural geology.....	\$62,980
Subsection of geology of Coastal Plain.....	12,200
Section of paleontology.....	23,570
Section of economic geology of metalliferous ores.....	39,500
Section of economic geology of nonmetalliferous minerals, including potash.....	34,300
Section of economic geology of western fuels.....	51,946
Section of economy geology of eastern fuels.....	15,600
Work of land-classification board.....	25,000
Supervision, administration, salaries of clerical, technical, and skilled-labor force.....	70,604
	335,700

The above table shows that \$240,096 was expended directly for geologic work, including the search for potash. Of this amount \$141,746, or 59 per cent, was expended west of the one hundredth meridian and \$98,350 east of that line.

The cooperative funds expended during the fiscal year 1911-12 were as follows:

General Land Office, for coal-land classification-----	\$35,000
General Land Office, classification of Northern Pacific land grant-----	13,238
Indian Office, classification of land in Indian reservations, Montana, Washington, and Oklahoma-----	8,709
Department of Justice-----	1,763
Cooperation with States and official organizations-----	4,850
	63,560

The money allotted by the General Land Office, amounting to \$48,238, was expended west of the one hundredth meridian. The first item of \$35,000 was expended by the section of western fuels, for classification of coal land.

In the cooperative agreements for geologic work with the States of Alabama, Illinois, and Missouri it is provided that the funds contributed by the States should be handled by the local organization. In the cooperative agreements with Oklahoma, Maine, and Tennessee the cooperative funds contributed by the States have been expended by the United States Geological Survey.

During the fiscal year geologic work was done in 40 States, listed below:

Alabama.	Massachusetts.	Oklahoma.
Arizona.	Michigan.	Oregon.
Arkansas.	Minnesota.	Pennsylvania.
California.	Mississippi.	South Carolina.
Colorado.	Missouri.	South Dakota.
Delaware.	Montana.	Tennessee.
Georgia.	Nevada.	Texas.
Idaho.	New Hampshire.	Utah.
Illinois.	New Jersey.	Vermont.
Kansas.	New Mexico.	Virginia.
Kentucky.	New York.	Washington.
Louisiana.	North Carolina.	Wyoming.
Maine.	North Dakota.	
Maryland.	Ohio.	

SECTION OF AREAL AND STRUCTURAL GEOLOGY.

WORK OF CHIEF OF SECTION.

The work of Arthur Keith has been for the most part of an administrative character, consisting mainly of conferences with other geologists and supervision and inspection of results in areal and structural geology, both in the field and in the office. Much of this work has been done in connection with the geologic folios. The attainment of harmony and unity in the folios requires frequent conferences on all matters treated in them.

A great deal of Mr. Keith's time has been devoted to service on committees, including those on geologic names, illustrations, plans, and maps. The largest single portion of this committee service has consisted of work done on geologic names under his chairmanship until March 15, when he resigned on account of press of other work.

Maps of the following quadrangles already submitted for folio publication were inspected in the field: Boston and Marlboro, Mass.; Brandon and Castleton, Vt.; East Columbus and West Columbus, Ohio; and Colorado Springs, Colo.

Field conferences were held and inspection trips made by Mr. Keith with the geologists who were mapping the areal geology in the following quadrangles: Portland, Maine; Worcester and Marlboro, Mass.; Ducktown, Tenn.; Gaffney, S. C.; Cohutta, Ga.; Columbus, Ohio; Vinita, Nowata, and Claremore, Okla.; Deadwood and Rapid, S. Dak.; Minneapolis and St. Paul, Minn.; Castle Rock and Colorado Springs, Colo.

Mr. Keith, with the assistance of D. B. Sterrett, completed the review of the areal geology of the Cowee quadrangle, N. C., which will soon be offered for publication in a folio. He completed, also with Mr. Sterrett, the joint study of the areal geology of the Gaffney quadrangle.

Special investigations were continued by Mr. Keith into the faulted structure of the north end of the Taconic Mountains in the Brandon and Castleton quadrangles, Vt. A paper on this faulted area was presented at the meeting of the Geological Society of America. He also continued his study of the structure and stratigraphic succession of the rocks of the Vermont Valley and Green Mountains in the vicinity of Brandon, Vt.

Further studies were made in the peculiar metamorphic rocks around Ducktown, Tenn., and Murphy, N. C. A brief special study was made, in company with E. M. Kindle, of the Devonian section and of the boundary between the Ordovician and Silurian strata along Cumberland Mountain in northeastern Tennessee and Virginia.

A reconnaissance was made by Mr. Keith in the Talbotton quadrangle, Ga., and Walhalla quadrangle, S. C.

The greater portion of Mr. Keith's office time was occupied with investigations and discussions in connection with geologic folios. The descriptive texts of nine folios in course of preparation were critically read by Mr. Keith and the structural geology and areal mapping of these folios and many others were especially considered. In the editorial work he was assisted during the year by Laurence La Forge.

Numerous papers presented for publication by the Survey or in various periodicals were critically read, and the geologic maps for Survey reports were examined.

WORK IN NEW ENGLAND STATES.

The description of the geology of the Eastport quadrangle, Maine, has been completed by E. S. Bastin for folio publication in cooperation with the State of Maine.

F. J. Katz began the areal and economic survey of the Portland and Casco Bay quadrangles, Maine, for publication in a folio in cooperation with the State Water Storage Commission. This work was somewhat more than half done at the end of the field season. A preliminary map has been prepared by Mr. Katz and the field material has been worked up to date. From May 23 to the end of the fiscal year Mr. Katz was occupied in an examination of areas in North Carolina which are proposed for forest reserves under the Weeks Act and in the preparation of reports thereon. This work lies mainly in the Cranberry, Morganton, and Mount Mitchell quadrangles.

C. H. Clapp has offered for publication as a bulletin a report on the igneous rocks of Essex County, Mass. The material for this report was obtained by Mr. Clapp at his own expense.

Progress has been made in the description of the Boston and Boston Bay quadrangles, Mass., for the Boston folio by Laurence La Forge.

Prof. B. K. Emerson continued his field work in the Monadnock and Peterboro quadrangles, N. H., in extension of his work in central Massachusetts. He also revised portions of the areal geology of the Marlboro and Worcester quadrangles, Mass. The descriptive texts for the Worcester-Marlboro folio and the Webster-Blackstone folio have been prepared jointly with W. C. Alden and the folios submitted for publication.

Prof. Emerson has nearly completed the descriptive text and maps for the Sheffield-Sandisfield folio, covering two quadrangles in western Massachusetts, for publication under joint authorship with Prof. Joseph Barrell and Prof. T. Nelson Dale.

Prof. Barrell has completed the maps and description of the eastern half of the Sheffield quadrangle.

Prof. Emerson has also made progress on work on the maps and text for the folio on the Pittsfield and Becket quadrangles in western Massachusetts, of which he and Prof. T. Nelson Dale are joint authors.

A preliminary report has been submitted by Prof. Emerson for publication as a bulletin on the geology of Massachusetts and Rhode Island. He has also submitted for publication as a bulletin a mineral lexicon of Worcester County, Mass.

W. C. Alden revised his descriptions of the Pleistocene geology of central Massachusetts for the folios covering the Worcester, Marl-

boro, Webster, Blackstone, Brookfield, Barre, Belchertown, and Palmer quadrangles.

Prof. T. Nelson Dale visited the marble districts of southeastern Vermont during July and August. The description of these has been prepared by him for publication in a bulletin. He also completed the revision of his manuscript for a bulletin on the commercial marbles of western Vermont (Bulletin 521). Prof. Dale made microscopic examinations of the roofing slates from Colorado, Georgia, California, and Lancaster County, Pa., for a report for the division of mineral resources. During June he visited the slate regions of Georgia, Tennessee, Virginia, Pennsylvania, and New Jersey to obtain material for a revised edition of Bulletin 275, "Slate deposits and slate industry of the United States," which is now out of print.

WORK IN NORTHERN APPALACHIAN REGION.

The manuscript for the folio on the Niagara region, N. Y., has been submitted by E. M. Kindle and F. B. Taylor. The Paleozoic formations have been described by Mr. Kindle and the Pleistocene by Mr. Taylor.

Prof. W. S. Bayley held a field conference in the Highlands of New Jersey during September with Dr. H. B. Kümmel, State geologist of New Jersey. During the winter Prof. Bayley completed the maps and descriptions of the pre-Cambrian rocks in the Easton and Delaware Water Gap quadrangles in New Jersey and Pennsylvania, thus completing for folio publication a discussion of the pre-Cambrian geology of the New Jersey Highlands. The preparation of the descriptions of the Paleozoic and Pleistocene formations in these quadrangles has been begun by Dr. Kümmel.

The maps and descriptions of the Bellefonte quadrangle, Pa., for folio publication have been submitted by Prof. E. S. Moore.

The geologic maps of the Coatesville and West Chester quadrangles, Pa., were revised by Prof. Florence Bascom and the mapping and study of the gneisses in the Boyerton quadrangle, Pa., was begun. Prof. Bascom has completed the description of the volcanic rocks of South Mountain for the Fairfield-Gettysburg folio.

Dr. C. K. Swartz is making a detailed study of the Carboniferous rocks in the Frostburg and Flintstone quadrangles, Md., for the Maryland Geological Survey and will revise the descriptions of those rocks for the Frostburg-Flintstone folio.

The areal mapping and study of the Coastal Plain in the Elkton and Wilmington quadrangles, Del., have been continued by Prof. B. L. Miller, assisted by M. I. Goldman. This work is being done in cooperation with the Maryland Geological Survey. Progress has been made in the preparation of the folio manuscript for these quadrangles.

Dr. W. B. Clark, State geologist of Maryland, has carried on work on the Upper Cretaceous of Maryland with E. W. Berry and M. I. Goldman, on the Tertiary of Virginia and North Carolina with Dr. Julia A. Gardner, and on the Lower Cretaceous with E. W. Berry and Arthur Bibbins. Office work has been carried on and substantial progress made for all these projects.

WORK IN SOUTHERN APPALACHIAN REGION.

Work in the Abingdon quadrangle, Va., was continued by G. W. Stose and the northern half was nearly completed. A report on the salt and gypsum deposits in the area has been submitted for publication by Mr. Stose (in Bulletin 530).

Work in the Kings Mountain region of North and South Carolina was continued by D. B. Sterrett, who did a small amount of revision in the Kings Mountain quadrangle, practically completed the areal survey of the Gaffney quadrangle, S. C., and mapped about one-fourth of the Lincolnton quadrangle, N. C.

A small amount of revision of the areal geology of the Cowee quadrangle, N. C., was completed in June by Mr. Keith and Mr. Sterrett. The last three weeks in June were devoted by Mr. Sterrett to an examination of areas for proposed forest reserves under the Weeks Act in the Pisgah and Cowee quadrangles, N. C., and to the preparation of a report thereon.

WORK IN CENTRAL STATES EAST OF THE NINETY-SEVENTH MERIDIAN.

The field work on the Pleistocene deposits of the East and West Cincinnati quadrangles, Ohio, was completed by Prof. N. M. Fenneman for folio publication. This included some work in areas adjoining on the north. The areal geologic map of the Paleozoic formations for these quadrangles has been completed by E. O. Ulrich and the preparation of the descriptive text has been begun. The folio covering the area will be published under the joint authorship of Mr. Ulrich and Prof. Fenneman.

The manuscript maps and descriptions for the Columbus folio, covering the East and West Columbus, Dublin, and Westerville quadrangles, Ohio, have been transmitted for publication by Dr. J. A. Bownocker, State geologist. The descriptions were prepared by Dr. Bownocker, Prof. C. R. Stauffer, and Prof. G. D. Hubbard. This folio is to be a cooperative publication by the Federal and State geological surveys and the material has been obtained mainly at the expense of the Ohio Survey. Prof. Stauffer has described the Paleozoic formations, Prof. Hubbard the Pleistocene formations and the geography, and Dr. Bownocker the economic geology.

The manuscript maps and descriptions for the Cleveland folio, covering the Cleveland, Euclid, and Berea quadrangles, Ohio, have

been transmitted by Dr. H. B. Cushing for publication. Dr. Cushing has prepared the descriptions of the Paleozoic geology, Dr. Frank Carney those of the Pleistocene formations, and Dr. F. R. Van Horn those of the economic geology.

Prof. W. H. Sherzer has completed the field work for the folio on the Detroit quadrangle, Mich. He has finished the areal geologic maps and has made considerable progress with the descriptions of the area. This work has been done in cooperation with the State Geological Survey.

The monograph on the Pleistocene of Indiana and Michigan has been revised and transmitted for publication by Frank B. Taylor and Frank Leverett.

The examination and mapping of the Pleistocene formations of northern and northeastern Minnesota have been continued by Frank Leverett, assisted by E. R. Preston.

Field conferences were held by Mr. Leverett on questions of Pleistocene geology with Prof. F. W. Sardeson in the Minneapolis-St. Paul area; with Prof. Samuel Weidman in northeastern Wisconsin; and with Prof. W. H. Sherzer in the Detroit area, Mich.

A bulletin by Mr. Leverett on the Pleistocene deposits and soils of the Northern Peninsula of Michigan was published by the State Geological Survey in cooperation with the United States Geological Survey. Mr. Leverett has also completed for publication by the State Survey a map of the Pleistocene deposits and soils of the Southern Peninsula of Michigan.

The collection of statistics and the gathering of information on the Lake Superior iron districts was continued under the direction of Pres. Charles R. Van Hise.

The examination and mapping of the Minneapolis, St. Paul, Anoka, and White Bear quadrangles, Minn., was completed by Prof. F. W. Sardeson, who has submitted for folio publication the maps and descriptions of those areas.

The areal mapping of the De Queen quadrangle, Ark., was continued by Prof. A. H. Purdue, State geologist, assisted by H. D. Miser, as far as the topographic base was done. A small area near Hot Springs, Ark., was reexamined by Prof. Purdue, the work on this quadrangle for folio publication being thus completed.

A reconnaissance section was run northwest from the Caddo Gap quadrangle to Arkansas River by Prof. Purdue and Mr. Miser. Mr. Miser, jointly with E. O. Ulrich, made a special review of certain Paleozoic formations in the Harrison and Eureka quadrangles, Ark. This work was extended into the Yellville quadrangle, Ark., so that the field work in those quadrangles is now completed. Progress has been made by Prof. Purdue in writing the descriptive text for the Caddo Gap folio, but he has been delayed because of his appointment as State geologist of Tennessee.

WORK IN THE PUBLIC-LAND STATES.

Central States west of the ninety-seventh meridian.—The areal and economic survey of the Vinita quadrangle, Okla., was completed by Dr. D. W. Ohern. This work was done in cooperation with the State Survey of Oklahoma for folio publication. The office work on the maps and oil-well records is nearly completed, and progress has been made on the descriptions for the folio. Office work has been continued on the folio for the Nowata quadrangle, Okla., by Dr. Ohern and the manuscript will soon be submitted for publication. Office work is being done on a bulletin on the oil and gas resources of northeastern Oklahoma under the joint authorship of Dr. Ohern and Carl D. Smith.

The areal and economic survey of the Claremore quadrangle, Okla., was completed by Carl D. Smith, assisted by Robert H. Wood. The manuscript maps and descriptions for this quadrangle are now almost ready to be submitted for folio publication. This work has been done in cooperation with the State Survey of Oklahoma.

J. A. Taff has continued his preparation of the McAlester folio as fast as his professional duties permitted since his resignation from the Survey. It is expected that the manuscript will soon be submitted for publication.

C. E. Siebenthal continued his investigations of the zinc and lead deposits of northeastern Oklahoma and southwestern Missouri. The results of these studies will be incorporated in the Wyandotte folio, on which progress is being made.

N. H. Darton has completed for folio publication the description of the Cambrian and later formations in the Rapid and Deadwood quadrangles, S. Dak. A revision of the areal geology of the Spearfish quadrangle, S. Dak., was begun by Sidney Paige, and most of the area of the quadrangle was covered. The results of this work will be published as a special map in the Rapid-Deadwood folio.

Rocky Mountain region.—Work was carried on by M. R. Campbell, assisted by J. R. Hoats, on the survey of the Chief Mountain, Browning, and Midvale quadrangles, Mont., for folio publication. This area includes the larger part of the Glacier National Park. In association with Mr. Campbell, W. C. Alden, assisted by J. E. Thomas, conducted the work on the Pleistocene and the glacial features of the region. T. W. Stanton, paleontologist, was also for some time associated with Mr. Campbell in this work. Brief outlines of the results of this work have been presented by Mr. Campbell and Mr. Alden before the geological societies.

The survey of the Castle Rock quadrangle, Colo., was undertaken for a geologic folio by G. B. Richardson. The maps and descriptions for this folio have been completed and submitted for publication. Mr. Richardson also completed for outside publication a

report on the Monument Creek group in Colorado and a report on the structure of the foothills of the Front Range in Colorado.

In the Colorado Springs quadrangle, Colo., a small amount of revision was done by Prof. G. I. Finlay during and after a field conference with Mr. Keith in September.

The descriptive text for the folio on the Apishapa quadrangle, Colo., was completed by G. W. Stose and is now in press.

The survey of the San Juan Mountains in Colorado has been continued by Whitman Cross, assisted by E. S. Larsen, jr., and also during the field season by J. F. Hunter. The survey of the San Cristobal quadrangle, Colo., was completed for folio publication. The eastern half of the Uncompahgre quadrangle, Colo., was examined in a reconnaissance manner preliminary to preparation of a folio.

Office work has been carried on by Messrs. Cross and Larsen in preparation of the maps and descriptions for the San Cristobal folio, which will probably be submitted at an early date. Mr. Cross, with Mr. Larsen, has prepared for publication a paper on the unconformity at the base of the La Plata sandstone in Colorado. A bulletin on the potash-bearing rocks of the Leucite Hills, Wyo., has been prepared by Mr. Cross and A. R. Schultz and published as Bulletin 512.

The petrographic descriptions of the igneous rocks of the Apishapa quadrangle, Colo., have been completed by Mr. Cross for the Apishapa folio. Work upon a monographic discussion of the Hawaiian lavas has also been continued but is not yet completed. Mr. Cross served also as chairman of the committee to prepare definitions of sedimentary rock names.

A survey of the areal geology of Creede, Colo., and vicinity was made by E. S. Larsen, jr., in conjunction with W. H. Emmons, to complete the report on that mining district for publication as a professional paper.

Work was continued by Prof. W. W. Atwood, assisted by Kirtley F. Mather, on the Quaternary geology of the San Juan region, Colo. This work was carried on in association with that of Mr. Cross and the two parties were immediately associated in the field. The eastern half of the San Cristobal quadrangle was studied in detail, together with considerable adjoining territory to the south and east. In addition to the Quaternary mapping, Prof. Atwood is carrying out a systematic study of the physiographic development of the San Juan Mountains, aiming to connect the history of the mountains with that of the adjoining plateaus. He also did a small amount of work in the northern and eastern parts of the Montrose quadrangle, worked up the field data in the office, and put them into form for folio publication.

In connection with the investigation of underground water for the Indian Office, Prof. H. E. Gregory made a geologic reconnaissance of the Moki Buttes, Choiskai and Lukachukai mountains, and the Seven Lakes oil field, all on the Navajo and Moki reservations in Arizona and New Mexico. A geologic map and descriptions to accompany it are in preparation for the Navajo Reservation.

The descriptions for the geologic folio on the Silver City quadrangle, N. Mex., have been completed by Sidney Paige and submitted for publication. Mr. Paige also completed a small amount of revision of the folio text for the Llano and Burnet quadrangles, Tex., and the folio has been published.

A small amount of revision was done by N. H. Darton in the Deming quadrangle, N. Mex., and he has completed and submitted the maps and descriptions for the Deming folio.

Work has been continued by Prof. C. F. Tolman, jr., on the areal and economic survey of the Tucson quadrangle, Ariz., for folio publication. The field work for this folio is completed and the maps and descriptions will soon be submitted for publication.

Work on the Pacific coast.—The survey of the Klamath Mountains in northern California and Oregon has been continued by J. S. Diller. Mr. Diller made a detailed geologic reconnaissance of the Galice-Kerby region, lying west of the Riddles and Grants Pass quadrangles, Oreg., and has prepared a map of the area.

A report on the mineral resources of southwestern Oregon was prepared by Mr. Diller.

Mr. Diller also revised and prepared new illustrations for his description of Crater Lake, Oreg., and this has just been republished by the Interior Department. The Geological Survey is occasionally called upon for exhibits of its work and results and in the preparation of these exhibits Mr. Diller has had much to do.

The preparation of the folio on the Ventura quadrangle, Cal., has been continued by Dr. Ralph Arnold. Only a small amount of his time since his resignation could be devoted to this work, but the folio is now practically completed.

(SUBSECTION OF GEOLOGY OF ATLANTIC AND GULF COASTAL PLAIN.

Work of chief of subsection.—T. Wayland Vaughan continued the supervision of Coastal Plain investigations. His field work consisted of an inspection tour in Louisiana, Texas, and Mississippi, where field parties were located. In order to obtain more information on the geology of the Canal Zone, for the purpose of correlating the geologic formations of the Gulf Coastal Plain with those of that region and procuring a basis for the intercorrelation of the geologic formations on the Atlantic and Pacific coasts of the United States, Mr. Vaughan spent one month, in October and November, in the

Canal Zone. The chairman of the Canal Commission, Col. George W. Goethals, and the Commission geologist, Mr. D. F. MacDonald, furnished Mr. Vaughan every possible facility for the prosecution of his investigation of the area. Arrangements have been made with specialists for the study of the collections procured. Mr. Vaughan also spent one month, in April and May, 1912, in the Bahamas, under the auspices of the Carnegie Institution of Washington. The object of this expedition was the extension of the studies of the geology and geologic processes of southern Florida to the Bahamas. Especial attention was given to the geology and the marine bottom deposits of the islands, and to the corals and coral reefs of Andros Island. Additional field work, mostly in June, was devoted to a continuation of his studies of the geology and geologic processes of southern Florida. Mr. Vaughan has almost completed his examination of the Florida keys, having visited nearly every one of the main line of keys. He has made substantial progress in his examination of the Florida coral reefs and his investigation of the corals of the region. The field expenses of these investigations in southern Florida are borne by the Carnegie Institution of Washington.

In the office Mr. Vaughan supervised the administrative work connected with the Coastal Plain investigations, read manuscripts and proofs of reports, studied collections of fossils (especially corals), and prepared summary statements of some of his investigations. He made progress in his researches on the correlation of the geologic formations of the Coastal Plain and resumed work on his monograph on the later Tertiary corals of the United States and the fossils of the West Indies and Central America.

The field work connected with the geologic survey of the Coastal Plain area is now completed as planned, except that for Cape Cod, the islands south of Massachusetts and Rhode Island, the delta of Mississippi River, a part of Mississippi, and the Rio Grande region of Texas.

During the fiscal year the following reports have been published or transmitted for publication:

The physiography and geology of the Coastal Plain province of Virginia, by William Bullock Clark and Benjamin LeRoy Miller, with chapters on the Lower Cretaceous, by Edward W. Berry, and the economic geology, by Thomas Leonard Watson. Cooperative report, published as Bulletin 4 of the Virginia Geological Survey.

Preliminary report on the geology of the Coastal Plain of Georgia, by Otto Veatch and Lloyd William Stephenson. Cooperative report, published as Bulletin 26 of the Georgia Geological Survey.

The New Madrid earthquake, by M. L. Fuller: Bull. U. S. Geol. Survey No. 494.

Notes on some clays from Texas, by Alexander Deussen: Bull. U. S. Geol. Survey No. 470-G.

Notes on the clays of Delaware, by George C. Matson: Bull. U. S. Geol. Survey No. 530-I.

A paper by E. W. Berry on the Upper Cretaceous and Eocene floras of South Carolina and Georgia was transmitted for publication as a professional paper.

A manuscript on the underground water resources of the Coastal Plain of Virginia, by Samuel Sanford, was transmitted to the State geologist for publication by the Virginia Geological Survey.

A report on the geology and underground waters of the Coastal Plain of North Carolina, by William Bullock Clark, B. L. Miller, L. W. Stephenson, B. L. Johnson, and H. N. Parker, is in press as a publication of the North Carolina Geological and Economic Survey.

The manuscripts prepared during the fiscal year are noted in the accounts of the work of individuals engaged in the Coastal Plain investigations.

Mr. Vaughan has been assisted in his paleontologic studies by Dr. C. Wythe Cooke, who gave particular attention to Tertiary fossils, and by Dr. Joseph A. Cushman, who studied the collections of Foraminifera from several of the formations of the Coastal Plain and from the Canal Zone.

Field work in the Coastal Plain investigation.—L. W. Stephenson continued the study of the geology and underground waters of parts of the Atlantic and Gulf Coastal Plain. He studied the stratigraphy and paleontology of the Cretaceous formations which outcrop in the region between Arkadelphia, Ark., and Uvalde County, Tex. T. W. Stanton accompanied Mr. Stephenson in southwestern Arkansas and northeastern Texas. Between Austin and Uvalde County the work was of a detailed reconnaissance nature and included the differentiation of formational units, the determination of stratigraphic and age relationship, and the collection of fossils. This work was done in part in collaboration with Alexander Deussen. The remainder of the year was spent by Mr. Stephenson in office work, which included proof reading, the preparation of reports, the preparation and study of fossil material relating in part to his own work and in part to the work of others, and the answering of referred letters. Work was done on the preparation of reports as follows:

A paper entitled "A deep well at Charleston, S. C.," originally intended for outside publication, is nearly completed and will be submitted for publication as a bulletin.

A cooperative report on the underground waters of the Coastal Plain of Georgia has been nearly completed; the part of this report relating to the underground waters of the Cretaceous deposits was prepared by Mr. Stephenson, and the part relating to the Tertiary and Quaternary deposits was prepared by Otto Veatch, assistant State geologist of Georgia.

A report on the underground waters of northeastern Arkansas, originally prepared by A. F. Crider, is now being revised and brought up to date by Mr. Stephenson.

In continuation of the work begun in 1909, Edward W. Berry spent two months in making field studies and collections from the plant-bearing beds of the Eocene, Oligocene, Miocene, and Pliocene in Alabama, Mississippi, Tennessee, Kentucky, Arkansas, Louisiana, and Texas. The data thus obtained furnish important criteria for determining the climatic and other physical conditions in southeastern North America during the Tertiary period. Office work done by Mr. Berry during the year includes the completion of a monograph on the Upper Cretaceous flora of the Gulf Coastal Plain, a flora largely ancestral to the Tertiary flora, as well as systematic studies of the Tertiary floras.

Investigations of the geology and hydrology of the Coastal Plain of Texas have been continued by Alexander Deussen. The months of July, August, and September, 1911, were devoted to field work, the party being in charge of Mr. Deussen, with David Donoghue as assistant. Reconnaissance surveys of the following counties of the Coastal Plain were completed: Bexar, Wilson, Karnes, Bee, Refugio, Arkansas, San Patricio, Live Oak, and a part of Medina. Mr. Deussen has in preparation a report on the geology and underground waters of the central Coastal Plain region of Texas. This report is about 65 per cent completed. A considerable portion of the time devoted to it has been taken up with the collection of analyses and tabulation of the analytical data. Mr. Deussen has also revised a report on the geology and underground waters of Texas east of Brazos River and south of Marion County. Some three months of office work have been devoted to this revision, and the report has been largely rewritten.

At the beginning of the year G. C. Matson was engaged in preparing a report on the phosphate deposits of Florida. This report was laid aside August 10 and field work on the upper Tertiary of the Gulf Coastal Plain was resumed where it had been abandoned in December, 1910. During the field season an area extending from south-central Mississippi to Alexandria, La., was examined in sufficient detail to permit a thorough revision of the former classification of the upper Tertiary formations. The field operations were suspended in November and were not resumed until May 1, 1912. During May the investigations of the previous season were extended to Sabine River and an excursion was made into eastern Texas for the purpose of correlating the work in Louisiana with that in Texas.

The months of January, February, and March were devoted to office work, and during this time Mr. Matson revised his report on

the geology and underground waters of Florida and completed his report on the phosphate deposits of Florida. In addition, he prepared a brief report on the clay deposits of Delaware and submitted it for publication as a part of Bulletin 530.

During April data were collected for a more detailed correlation of the upper Tertiary of Florida.

June 1 to 15 was devoted to a study of the oil field near Easton, La., and a detailed map was prepared showing the location of the wells and the topography of the salt dome with which the oil sands are associated. The collection of records of wells recently drilled has enabled Mr. Matson to outline the area where the structure seems favorable to the occurrence of oil.

A study of the process of sedimentation at the mouth of the Mississippi was undertaken during the last half of June.

SECTION OF PALEONTOLOGY AND STRATIGRAPHIC GEOLOGY.

T. W. Stanton continued to supervise the section of paleontology and stratigraphic geology.

At the beginning of the year Mr. Stanton was in the field with the party under M. R. Campbell, engaged in the study of the geology of the Glacier National Park and adjacent portions of the Blackfeet Indian Reservation. He studied the Mesozoic rocks exposed near the southern and eastern boundaries of the park and, with Eugene Stebinger, made an examination of the Cretaceous section along Cutbank Creek from the mountains to its junction with Two Medicine Creek. After leaving Mr. Campbell's party on August 18, Mr. Stanton examined some sections of Kootenai and associated rocks in the neighborhood of Great Falls and Belt, Mont., and then proceeded to Ashdown, Ark., to join L. W. Stephenson, with whom, from September 2 to September 13, he made a reconnaissance study of the Cretaceous formations at several localities between Ashdown and Sherman, Tex.

A large part of Mr. Stanton's time in the office was employed in making preliminary studies of current collections of Mesozoic invertebrate fossils and in preparing reports on them for the use of other geologists. The rest of his time was occupied by the reading of manuscripts, committee work, and administrative duties connected with the supervision of the section. A large increase in his committee work was caused by his appointment on March 23 to the chairmanship of the committee on geologic names.

Field studies on the early Paleozoic formations of Tennessee, Virginia, Missouri, and Arkansas were carried on during the summer of 1911 by E. O. Ulrich, assisted by Edwin Kirk and R. D. Mesler. These studies in Missouri and Arkansas were resumed in May and continued to the end of the year. In the office Mr. Ulrich continued

his general investigations of Paleozoic paleontology and stratigraphy and made the usual reports on collections for other geologists. He prepared for publication papers on the Clinton formation in the Appalachian region and on the Chattanooga shale and related formations. An illustrated work on the "Ozarkian" fauna was also brought nearly to completion and some progress was made on the text of the Cincinnati folio. Mr. Kirk acted as paleontologic assistant and Mr. Mesler attended to the routine work of preparing and caring for the collections.

H. S. Williams has continued work on a monograph of the Silurian and Devonian faunas of the Eastport quadrangle, Maine.

After completing work on the Niagara quadrangle, elsewhere referred to, E. M. Kindle continued his field studies on the correlation of Devonian formations. The problem of the correlation of the Chattanooga and Ohio shales was taken up in detail. In the field work Mr. Kindle was assisted for six weeks by P. V. Roundy. He prepared two papers on the results of the study of the Devonian shales south of Lake Erie and nearly completed a third manuscript on the Hamilton fauna of the Allegheny region. A considerable amount of Mr. Kindle's time has been spent in preparing special reports on collections of Devonian fossils made by other geologists who desired lists of species and determinations of horizons represented.

In the office R. D. Mesler and P. V. Roundy have both assisted Mr. Kindle for short periods in preparing the Devonian collections for study and reference.

G. H. Girty was employed in field work during July, August, and September, and spent the remainder of the year in the office. In the field he was engaged on problems connected with the stratigraphy and correlation of Carboniferous rocks in Kentucky, Tennessee, Arkansas, Missouri, Iowa, Kansas, Utah, Nevada, and Idaho. He was associated with Mr. Butts in Tennessee, Mr. Hinds in Kansas, and Messrs Umpleby and Richards in Idaho. In the office his time was devoted to elaborating data collected and to preparing reports on collections of fossils referred to him by other geologists. He completed for publication two papers on Carboniferous faunas from Arkansas. During most of the year he was assisted in routine preparatory work on collections by P. V. Roundy, who also spent one month collecting fossils and measuring sections in Georgia and Alabama.

The investigation of the marine Triassic formations of the Western States was continued, both in the field and in the laboratory, by J. P. Smith, who almost completed his monograph on the Upper Triassic fauna and made considerable progress on the monograph on the Lower Triassic.

All the work of preparing, recording, and caring for the collections of Mesozoic invertebrates and of fossil plants was done by T. E. Williard, who also during the year rearranged the reserve collections of fossil plants so that they are now easily referred to.

In connection with his stratigraphic work on the Cretaceous formations of the Gulf Coastal Plain L. W. Stephenson has made preliminary studies of the associated faunas.

A monograph on the Mesozoic and Cenozoic Echinodermata of the United States, by W. B. Clark and M. W. Twitchell, has been completed and transmitted for publication.

In addition to supervising geologic work in the Atlantic and Gulf Coastal Plain, T. W. Vaughan (see p. 50) continued his studies of recent and fossil corals, and, under his direction, late in the year, C. W. Cooke began work on the accumulated collections of Eocene mollusks. J. A. Cushman has begun to prepare a monograph on the Tertiary and Cretaceous Foraminifera of the Coastal Plain. A report on the Tertiary paleontology of Virginia and North Carolina, by Julia A. Gardner and a number of collaborators, is in preparation. The work of cleaning, assorting, and recording Tertiary invertebrates for Mr. Vaughan was done by I. B. Millner.

The work of W. H. Dall on tertiary invertebrate paleontology has this year consisted chiefly in the preparation and preliminary study of the large collection of fossils from the Canal Zone and adjacent areas in Central America, which was received from the Isthmian Canal Commission in October. The elaboration of this paleontologic material from the Isthmus of Panama should aid greatly in solving many important problems concerning the distribution of animals and plants and the geologic history of both North and South America. Mr. Dall also made considerable progress in his description of the fauna of the Oligocene "silex beds" of Tampa, Fla., which he is preparing for publication as a bulletin. The current work of recording, preparing, classifying, and reporting on collections and indexing the literature of Tertiary paleontology was kept up with the assistance of W. C. Mansfield.

David White has made the usual preliminary studies and reports for geologists on collections of Paleozoic fossil plants and has continued monographic investigations of the Paleozoic floras so far as his administrative duties would permit.

F. H. Knowlton continued the study of Mesozoic and Cenozoic fossil plants. For about four months and a half he was making preliminary examinations of the large current collections, mostly from the Rock Mountain area, and in preparing reports on them for the use of geologists. The remainder of the year he devoted to monographic work on the fossil plants of Raton Mesa, in northern New Mexico and southern Colorado, which will result in a large descrip-

tive volume, now nearly completed. Several short papers on paleobotanic subjects were prepared for outside publication during the year.

Under the joint supervision of Messrs. Knowlton and White, the work on the bibliography and compendium of paleobotany has been continued by Miss C. H. Schmidt, assisted by Miss I. P. Evans. This work is now practically completed to the close of 1910, all that remains being in the nature of a revision of American geologic horizons, editorial revision, and preparation for the printer.

E. W. Berry has nearly completed a report on the Eocene flora of the Southern States.

Through the courtesy of the United States National Museum all the collections of vertebrate fossils sent in by Survey field parties have been examined and reported on by J. W. Gidley and C. W. Gilmore.

SECTION OF ECONOMIC GEOLOGY OF METALLIFEROUS ORES.

Work of chief of section.—The chief of the section of economic geology of metalliferous ores, Waldemar Lindgren, devoted some time in the summer to field work in Utah, Nevada, and California, which is mentioned in detail below. The winter he spent in Washington, giving his time mainly to the administrative work of this section and to the work of the division of mineral resources relating to metallic production. In October, 1911, he visited Deadwood, S. Dak., and Idaho Springs, Colo., for conference and inspection. From November 20 to December 19 he was absent on leave without pay, giving a course of lectures at the Massachusetts Institute of Technology. The administrative duties of this section and those of the office of chief geologist occupied his time during the remainder of the year.

Eastern and Central States.—Little work was done in the Eastern and Central States. W. H. Emmons and F. B. Laney continued office work on a report on the Ducktown copper district, Tennessee, during such time as they could spare from their other work.

C. E. Siebenthal, who gave the larger part of his time to the preparation of chapters on lead, zinc, and cadmium for the division of mineral resources, also spent five months in completing a report on the genesis of the lead and zinc ores of the Joplin district, which will be published as a bulletin of the Survey. The discussion of the genesis of these ores grew out of the study of the ores of the Wyandotte quadrangle and is contributory and necessary to the completion of the folio and the economic report on that quadrangle.

Western States.—In Colorado field examinations were carried on at Creede and in the Gilpin County districts. E. S. Bastin spent four months and a half, assisted by J. M. Hill and for part of the

time by C. W. Henderson, in completing the field study of the economic geology of the Central City region, mainly a district of gold and silver bearing veins. The office work will be completed during the summer of 1912.

W. H. Emmons spent August and the first part of September in an examination of the metalliferous veins of the Creede mining district, Colo. In this work he was associated with E. S. Larsen, jr., who examined the areal geology of the district. Owing to the appointment of Mr. Emmons as professor of geology at the University of Minnesota, the field work was not completed, but it will be taken up in the summer of 1912. Mr. Emmons spent such time as he could spare from his regular work at the university in preparing a preliminary report on the Creede district (Bulletin 530-E).

The preparation of a final report on the ore deposits of Leadville, which had been interrupted by the death of S. F. Emmons in March, 1911, was intrusted to Prof. J. D. Irving, of Yale University, who for a number of years had assisted Mr. Emmons in the field and office work relating to this district. Prof. Irving continued this work during the winter and was aided by a draftsman engaged by the Survey to complete the geologic sections and maps of this district.

F. L. Hess undertook a reconnaissance of the vanadium (roscoelite) deposits in the vicinity of Placerville, Colo., in connection with a general reconnaissance of such deposits in several other States. A preliminary report was published in Bulletin 530-K. A bulletin on the crystallography and mineralogy of ferberite, mainly that of Boulder County, Colo., was prepared and submitted by Mr. Hess and W. T. Schaller. A considerable part of Mr. Hess's time was occupied in preparing reports on the production of the rare metals for the division of mineral resources.

In Wyoming D. F. Hewett, a member of the section of western fuels, examined the copper prospects of the Sunlight Basin and prepared some notes on them for publication in Bulletin 530-O.

In New Mexico F. L. Hess visited the vanadium districts in the Caballos district, a description of which was incorporated in Bulletin 530-K.

In Arizona a detailed study of the geology and ore deposits in the Tombstone district was made by F. L. Ransome. He also finished the field work for reports on the disseminated copper deposits of Ray and Miami and has nearly ready for publication the text and maps of the Ray folio. In connection with the work at Tombstone Mr. Ransome made a reconnaissance examination of the Turquoise district, the results of which were published as Bulletin 530-C. In preparation for a general report on the geology and ore deposits of Arizona, he also made a brief examination of the Bisbee district and visited the Superior and Jerome districts. During the winter Mr.

Ransome was occupied in preparing reports on the districts mentioned.

F. C. Schrader devoted the last months of the fiscal year to the preparation of a report on the mineral deposits of the Santa Rita and Patagonia Mountains, the field work of which had been completed during the previous year.

In Utah field work was continued during the summer of 1911 and also during May and June, 1912, by B. S. Butler. He examined the Marysvale, Silver Reef, Clifton, Spring Creek, Fish Springs, Dugway, Granite, Lucin, and other districts. During the winter Mr. Butler completed a professional paper on the ore deposits of the San Francisco and adjacent ranges. Together with H. S. Gale, Mr. Butler prepared a bulletin on the occurrence of alunite in the Marysvale district (Bulletin 511).

Waldemar Lindgren, assisted by G. F. Loughlin, completed during the fall a reexamination of the Tintic district, undertaken for the purpose of recording the important developments that had taken place since the district was examined by George Otis Smith and G. W. Tower. A report on the district is in preparation.

F. L. Hess examined the vanadium deposits in the San Rafael Swell near Green River and prepared a short report on them for publication in Bulletin 530-K.

A short paper on the economic geology of the La Sal Mountains, based on field work of the previous year, was prepared by J. M. Hill and published as Bulletin 530-M.

In Idaho J. B. Umpleby spent two weeks in 1911 in revisiting the Texas mining district in Lemhi County. He also spent four weeks in a geologic reconnaissance of the Bayhorse, Yankee Fork, and Loon Creek mining districts, in northwestern Custer County. The reports on both these areas have been submitted. Late in June he returned to Idaho and started a geologic reconnaissance in the vicinity of Mackay. A preliminary account of the ore deposits of the Loon Creek district was published in Bulletin 530-G.

In connection with the geologic mapping of the Taft quadrangle, Idaho and Montana, F. C. Calkins and E. L. Jones, jr., prepared a short paper on the geology and mineralization of the St. Joe-Clearwater region, which was published in Bulletin 530-G.

In Montana economic field work was carried on near Helena and in the Dillon region. During the field season of 1911 Adolph Knopf, assisted by H. G. Ferguson, mapped the geology and studied the ore deposits of an area of 1,300 square miles in central-western Montana on a scale of 1:250,000. This area includes a large number of mining camps extending from Marysvale on the northwest to Elkhorn on the southeast. A report embodying the results of the field observations was prepared during the winter and submitted for publication.

During July and August A. N. Winchell completed field work in the mining districts in southwestern Montana continued from last year. During the winter Prof. Winchell devoted such time as he could spare from his regular duties to preparing a report on the field work of the two seasons. The report will be completed during the summer of 1912. On June 11 Prof. Winchell resigned as assistant geologist in the Survey.

In Washington no field work was undertaken, but a report on the ore deposits of the northeastern part of the State, for which the field work had been completed during the previous year, was finished by Howland Bancroft. Mr. Bancroft resigned May 31 as assistant geologist in the Survey.

In Oregon the only field work relating to the examination of ore deposits was done by J. S. Diller, who during the summer of 1911 surveyed a number of smaller mining camps in the Kerby and Galice mining districts, in the southwestern part of the State. Mr. Diller spent a part of the winter in preparing a report on this region.

In California practically no field work relating to metalliferous deposits was undertaken. Mr. Lindgren spent some days in investigating the gold-dredging deposits of the central part of the State, at Marysville and Folsom. D. F. MacDonald prepared a paper on the gold lodes of the Carrville district, Trinity County, which was published as Bulletin 530-D, the field work having been completed in a previous year.

Progress was made by F. L. Hess in the preparation of the report on the Randsburg gold-mining district.

L. C. Graton, under contract to complete a report on the copper mines of Shasta County based on the field work of previous years, states that the report will be completed in the summer of 1912.

In Nevada F. C. Schrader began a reconnaissance of the Wonder, Fairview, and Rawhide mining districts. During part of the time he was assisted by H. S. Gale. The work was unexpectedly interrupted by Mr. Schrader's assignment to the examination of mining properties in Nevada for the Department of Justice. On returning to the Washington office in the spring he continued the preparation of his report on a geologic reconnaissance in Arizona. Mr. Schrader also prepared a paper on the Antelope district, which was published as Bulletin 530-J. In August Mr. Lindgren completed the survey of the National mining district, in the northern part of Nevada. A report on this district is in preparation.

Miscellaneous general work.—During the year W. H. Emmons completed a report on the enrichment of sulphide ores, consisting of a general discussion and a compilation of the data contained in the literature on American mining districts published since 1900. It will be published as Bulletin 529.

J. M. Hill devoted some time to the completion of Bulletin 507, containing a descriptive list and maps of the mining districts of the Western States. Waldemar Lindgren prepared a geologic introduction for this bulletin.

In April, May, and June R. W. Stone, assisted by E. L. Jones and H. G. Ferguson, was detailed to complete and revise a report on the occurrence of industrial minerals in the United States, which will be issued as a part of the annual volume "Mineral resources of the United States."

B. S. Butler made short visits to the Lake Superior copper district, in Michigan, and the Butte district, in Montana, and prepared a report on the production of copper in the United States for the division of mineral resources.

Examinations for other departments.—At the request of the Department of Justice F. C. Schrader was detailed in September to make an examination of mining properties in the Bovard, Goldfield, and Diamond Field mining districts, Nev., and his services were subsequently continued in connection with this work for the department in the Federal district court at New York until March.

In December J. M. Hill, on a request from the Department of Justice, was detailed to make an examination of the properties of a mining company in Shasta County, Cal. The completion of the report on this property occupied his time until the middle of February.

At the request of the Post Office Department E. F. Burchard and D. F. Hewett were detailed to make a brief preliminary investigation of alleged deposits of manganese and iron ore, ocher, marble, and limestone in western Maryland near Harpers Ferry, W. Va., and gave testimony on the subject before the Federal grand jury at Baltimore, Md.

In March, 1912, the newspapers announced the discovery of a billion tons of iron ore in Pennsylvania. G. H. Ashley was detailed at once to investigate the matter, and his findings, failing to substantiate the discovery, were published widespread the following week through the medium of a special press bulletin.

Classification of Northern Pacific Railroad lands.—An item in the sundry civil act of June 25, 1910, being an amendment to the act of February 26, 1895 (Stat. L., vol. 28, p. 683), entitled "An act to provide for the examination and classification of certain mineral lands in the States of Montana and Idaho," made an appropriation to the General Land Office for completing the classification, as to their mineral or nonmineral character, of certain specified lands within the grant of the Northern Pacific Railroad in Montana and Idaho. Under the authority of the Secretary of the Interior the field examination and the classification of these lands were assigned to the

Geological Survey. An additional appropriation was made for this purpose in the sundry civil act of 1911 and the work was completed during the present fiscal year. F. C. Calkins, assisted by E. L. Jones, jr., completed examinations in the St. Joe and Clearwater basins, Idaho.

J. T. Pardee was occupied during almost the entire year in classifying lands in western Montana. In the winter he was mainly occupied in preparing data for the land-classification board. From January 18 to February 12 he attended the hearing at the land office at Cœur d'Alene, Idaho, giving testimony, together with H. S. Gale, in cases contested by the Northern Pacific Railway.

R. W. Stone was engaged during the greater part of the year in classifying many small and widely scattered tracts in central Montana. He was assisted in the field by Prof. Bert Kennedy, of Illinois.

Classification of lands in Indian reservations.—A sum having been set aside by the Indian Office for separating the mineral from the nonmineral lands in the Colville Indian Reservation, Wash., J. T. Pardee was detailed to this duty on June 1 and spent the month of June in organizing and beginning the work.

SECTION OF ECONOMIC GEOLOGY OF NONMETALLIFEROUS MINERALS.

Work of chief of section.—During the first part of the year F. B. Van Horn was engaged largely in administrative duties in Washington. From September 3 to October 8 he spent some time visiting field parties in Idaho and Oregon, but on account of the resignation of C. W. Hayes, chief geologist, he returned to Washington, serving as acting chief geologist between the date of the resignation of Mr. Hayes and that of the appointment of Mr. Lindgren. From May 14 to May 31 Mr. Van Horn spent some time in Kentucky and Tennessee visiting reported phosphate deposits. The rest of the year he spent in administrative work for the geologic branch and as acting chief geologist. He also prepared a report on the production of phosphate rock in 1911 for publication in the volume "Mineral resources of the United States."

Eastern and Central States.—A detailed investigation of the Clinton and other red iron ore deposits of the Appalachian region in eastern Tennessee, northeastern Alabama, and northwestern Georgia was carried on by E. F. Burchard. The field work of this investigation occupied most of his time from the middle of July to the end of November. The work in Tennessee was done in cooperation with the State Geological Survey, and that in parts of Tennessee, Alabama, and Georgia near Chattanooga in cooperation with the Chattanooga Chamber of Commerce. For the purpose of obtaining exact measurements and fresh samples of ore Mr. Burchard, with the assistance of J. R. Ryan, a practical mining superintendent,

systematically prospected the ore beds at intervals ranging from half a mile to 5 miles along more than 250 miles of outcrop—a method which is new to Survey practice in the investigation of metalliferous ores but which yielded definite and valuable information on many hitherto uncertain points. The preparation of two bulletins based on this field work is under way—a description of the red iron ores of eastern Tennessee, to be published by the Tennessee Geological Survey, and a description of the red iron ores of eastern Tennessee, northeastern Alabama, and northwestern Georgia, to be published by the United States Geological Survey.

Mr. Burchard prepared considerable material for a bulletin by E. C. Eckel on the Portland cement materials and industry of the United States, the manuscript and illustrations of which were submitted for publication as Bulletin 522. He also prepared reports on the production of iron and manganese ores, fluorspar, cement, building stones, lime, gypsum, glass sands, and concrete materials, for publication in the volume "Mineral resources of the United States."

W. C. Phalen made a study of the salt industry in the United States, with special reference to the occurrence of potash salts in brines and bitterns or associated with rock salt. The analytical work connected with the investigation is now being done by the Bureau of Soils, Department of Agriculture, but is not yet finished, and the detailed report must await these analytical results. During the course of the work Mr. Phalen visited New York, Michigan, Ohio, West Virginia, Pennsylvania, Kansas, and Louisiana. A short report embodying part of the results obtained on this trip was prepared and published as Bulletin 530-B.

The work in connection with the search for potash salts was placed in charge of Hoyt S. Gale. The early part of the field season was devoted to a review of the saline deposits in the Laramie Basin, southern Wyoming. This was followed by the selection of a drilling equipment and a site for preliminary drilling and the subsequent installation of the drilling equipment near Fallon, Nev., with J. H. Hance in charge of the outfit.

Investigations as to the finding of commercial supplies of potash salts have been concentrated along the following lines:

1. The exploration, by deep boring, for deposits of buried salines in Nevada and in other localities in the western public-land States, by a party in charge of J. H. Hance, under the direction of Hoyt S. Gale.
2. The investigation of the occurrence of certain rich potash-bearing rocks and minerals, described in short reports.
3. The investigation of the salt deposits and the brines and bitterns in the United States east of the Rocky Mountains, carried on by W. C. Phalen, under the supervision of David T. Day.

4. A limited amount of general field work in the Western States by Hoyt S. Gale.

Naturally work on such a subject as this has not been concluded within a single year, but preliminary reports have been prepared on the progress of the Government boring near Fallon, Nev., by Hoyt S. Gale (Bulletin 530-A); on the investigation of the salines east of the Rocky Mountains, by W. C. Phalen (Bulletin 530-B); on the discovery of a new deposit of alunite near Marysville, Utah, as a possible source of potash, by B. S. Butler and Hoyt S. Gale (Bulletin 511); on the extent and distribution of leucite rock in southern Wyoming as a possible source of potash, by Whitman Cross and A. R. Schultz (Bulletin 512); and on the occurrence of nitrates in the United States, by Hoyt S. Gale (Bulletin 523). A general review of the subject is contained in a chapter from "Mineral resources" entitled "Potash salts, summary for 1911," by W. C. Phalen.

During the summer of 1911 Eliot Blackwelder made a survey of the Gros Ventre Mountains, in western Wyoming, and the west end of the Wind River Range, part of the district reconnoitered by him in 1910. During the winter special reports and plats, to serve as a basis for classifying the phosphate lands in the area surveyed, were prepared for 33 townships.

R. W. Richards, assisted by G. R. Mansfield, made a detailed examination of eight townships in the Wayan quadrangle, southeastern Idaho. These townships included large areas of phosphate lands. A preliminary report has been prepared and submitted for publication.

Messrs. Richards and Mansfield also continued the examination of the Montpelier quadrangle, Idaho.

In company with A. R. Schultz, Mr. Richards made a rapid reconnaissance of that portion of Idaho lying south of Snake River and north of the areas mapped and studied in detail by Messrs. Richards and Mansfield in 1910 and 1911. The data collected warranted the elimination from the phosphate reserve of large areas which had been originally included on the basis of the mapping by the Hayden Survey in 1877. A report of this reconnaissance examination was prepared and submitted for publication in Bulletin 530-H.

SECTION OF ECONOMIC GEOLOGY OF FUELS.

WORK OF CHIEF OF SECTION.

During the fiscal year M. R. Campbell remained in general charge of the fuel section. From the beginning of July to the middle of October he was engaged in areal mapping in the Glacier National Park and vicinity, Mont. During the remainder of the year Mr. Campbell was engaged in general administrative duties connected

with the fuel section and in preparing reports for publication. The most important of these was Bulletin 471, "Contributions to economic geology, 1910, Part II." Owing to the delay in preparation this is an unusually large volume and required a large amount of work in revision and editing before it was ready to submit for publication. In addition to the report, a paper by Alfred R. Schultz on the geology of central Uinta County, Wyo., was revised and submitted for publication as a bulletin of the Survey, a report on the Standing Rock and Cheyenne River Indian Reservations was almost completed, and considerable progress was made in assembling and revising papers for Bulletin 531, "Contributions to economic geology, 1911, Part II." Mr. Campbell has also made a new estimate of the coal resources of the United States for consideration at the meeting of the International Geological Congress in Ottawa, Canada, in 1913.

CLASSIFICATION OF SUPPOSED COAL AND OIL LANDS.

The examination of coal and oil fields in the public-land States for classification was continued during the summer of the present fiscal year. Mr. Campbell was assisted by E. G. Woodruff and W. R. Calvert, the former exercising close personal supervision in both field and office and the latter for a few months only in the field. The following list includes projects examined and those in which the work was in progress at the end of the fiscal year. It also contains brief notice of reports that are in progress or have been completed, and the names of the geologists who have carried on the work.

Big Muddy lignite field, Perkins County, S. Dak. Geologic party in charge of D. E. Winchester examined in detail 1,680 square miles of supposed lignite land. Land classified and geologic report prepared.

Little Missouri River lignite field, Harding County, S. Dak. Geologic party in charge of E. M. Parks examined in detail 1,595 square miles of supposed lignite land. Land classified and geologic report prepared.

Marmarth lignite field, Billings County, N. Dak. Geologic party in charge of C. J. Harnes examined in detail 1,070 square miles of supposed lignite land. Land classified and geologic report in preparation.

Williston lignite field, Williams County, N. Dak. Geologic party in charge of F. A. Herald examined in detail 620 square miles of supposed lignite land. Work interrupted September 16 by detail of Mr. Herald to make an examination of a part of the Fort Berthold Indian Reservation. Land classified and geologic report prepared.

Fort Berthold Indian Reservation (south of Missouri River), N. Dak. Geologic party in charge of F. A. Herald examined in detail 270 square miles of supposed lignite land. Work extended from September 20 to November 10. Land classified and geologic report prepared.

Fort Berthold Indian Reservation (north of Missouri River), N. Dak. Geologic report of work done by M. A. Plshel in 1910 submitted (in Bulletin 471).

Little Sheep Mountain lignite field, Rosebud, Custer, and Dawson counties, Mont. Geologic party in charge of G. S. Rogers examined in detail 1,440

square miles of supposed lignite land. Land classified and geologic report prepared.

Fort Peck Indian Reservation, Valley County, Mont. Geologic party in charge of C. M. Bauer examined 2,016 square miles, part in reconnaissance and part in detail. Land classified.

Baker lignite field, Custer County, Mont. Geologic report of work done by C. F. Bowen in 1910 submitted (in Bulletin 471).

Terry lignite field, Custer County, Mont. Geologic report of work done by F. A. Herald in 1910 submitted (in Bulletin 471).

Glendive lignite field, Dawson County, Mont. Geologic report of work done by J. H. Hance in 1910 submitted (in Bulletin 471).

Sidney lignite field, Dawson County, Mont. Geologic report of work done by Eugene Stebinger in 1910 submitted (in Bulletin 471).

Several lignite fields in eastern Montana. Report on geology by W. R. Calvert submitted (in Bulletin 471).

Culbertson lignite field, Valley County, Mont. Geologic report of work done by A. L. Beekly in 1910 submitted (in Bulletin 471).

Big Snowy Mountains coal field, Fergus County, Mont. Geologic party in charge of W. R. Calvert made reconnaissance survey of 972 square miles of possible coal land. Examination completed July 9, 1911. Land classified and report prepared.

Part of Milk River coal field, Chouteau County, Mont. Report begun by L. J. Pepperberg submitted (in Bulletin 471) by G. B. Richardson.

Tertiary coal fields of western Montana. Examination made by J. T. Pardee in connection with his examination of Northern Pacific Railway land grant in that part of the State. Lands classified and report prepared.

Blackfeet Indian Reservation, Teton County, Mont. Eugene Stebinger examined 1,512 square miles, partly in detail and partly in reconnaissance. Land classified and some progress made on geologic report.

Geologic party in charge of M. R. Campbell examined about 500 square miles in connection with the survey of the Glacier National Park. Land classified.

Bull Mountain coal field, Musselshell County, Mont. Field work done in previous years by R. W. Richards and C. T. Lupton. Geologic report completed by E. R. Lloyd.

Livingston and Trail Creek coal fields, Sweetgrass, Park, and Gallatin counties, Mont. Geologic report of work done by W. R. Calvert in 1908 submitted (in Bulletin 471).

Upper Stillwater Basin, Sweetgrass and Carbon counties, Mont. Geologic report of work done by W. R. Calvert in previous years submitted for publication.

Hound Creek district of Great Falls coal field, Cascade County, Mont. Geologic report of work done in 1909 by V. H. Barnett submitted for publication.

Electric coal field, Park County, Mont. Geologic report of work done by W. R. Calvert in 1908 submitted (in Bulletin 471).

Chehalis coal field, Cowlitz and Lewis counties, Wash. Examination made by A. J. Collier during July and August, 1911.

Belle Fourche Valley coal field, Weston and Converse counties, Wyo. Geologic party in charge of V. H. Barnett examined in detail 1,480 square miles of coal land. Land classified and geologic report partly prepared.

Little Powder River coal field, Crook County, Wyo. Geologic report of work done by John A. Davis in 1910 submitted (in Bulletin 471).

Buffalo-Sheridan coal field, Johnson and Sheridan counties, Wyo. Geologic party in charge of C. H. Wegemann examined in detail 90 square miles of coal land in connection with stratigraphic work along the east front of the Bighorn Mountains. Land classified.

Sussex coal field, Johnson County, Wyo. Geologic report of work done by C. H. Wegemann in 1910 submitted (in Bulletin 471).

Barber coal field, Johnson County, Wyo. Geologic report of work done by C. H. Wegemann in 1909 completed.

Powder River oil field, Johnson County, Wyo. Geologic report of work done by C. H. Wegemann in 1910 submitted (in Bulletin 471).

Lost Springs coal field, Converse County, Wyo. Geologic report of work done by D. E. Winchester in 1910 submitted (in Bulletin 471).

Oregon Basin and Meeteetse quadrangles, Park County, Wyo. D. F. Hewett, working in conjunction with a topographic party, examined in great detail 410 square miles of possible coal and oil land. Land classified.

Wind River coal region, Fremont and Natrona counties, Wyo. Geologic report of work done in 1908, 1909, and 1910 by E. G. Woodruff and D. E. Winchester submitted (in Bulletin 471).

Portion of central Uinta County, Wyo. Geologic report, based on field work by party in charge of A. R. Schultz in 1906, submitted for publication as separate bulletin.

Snake River valley, Idaho. C. F. Bowen, with one assistant, examined in a rapid reconnaissance 10,224 square miles of possible coal land. Land classified and two short geologic reports submitted.

Northwestern Oregon. Geologic report of work done by C. W. Washburne in 1910 on oil prospects submitted for publication.

North Park coal field, Jackson County, Colo. Geologic party in charge of A. L. Beekly examined in detail 1,777 square miles and covered by reconnaissance examination about 250 square miles additional. Land classified and geologic report prepared.

Meeker quadrangle, Rio Blanco County, Colo. E. T. Hancock, in conjunction with a topographic party, examined in great detail 216 square miles. Land classified and geologic report in course of preparation.

Glenwood Springs coal field, Garfield and Pitkin counties, Colo. Report on 216 square miles of coal field examined in great detail by A. L. Beekly in 1909 completed by G. S. Rogers.

De Beque oil field, Mesa and Garfield counties, Colo. Geologic report of work done by E. G. Woodruff in 1910 submitted (for Bulletin 531).

Coal resources of Gunnison Valley, Mesa and Delta counties, Colo. Geologic report of work done by E. G. Woodruff in 1910 submitted (in Bulletin 471).

Mancos coal field, Montezuma County, Colo. Geologic party in charge of Max A. Pishel examined in detail 829 square miles of supposed coal land. Land classified and geologic report in preparation.

Castle Valley coal field, Emery County, Utah. Geologic party in charge of C. T. Lupton examined in detail 500 square miles of supposed coal land. Land classified.

Blacktail (Tabby) Mountain coal field, Wasatch County, Utah. The examination of this field in 1910 was completed in the early part of the present fiscal year by the survey of 200 square miles of supposed coal land in the western part of the field. Land classified and geologic report submitted (in Bulletin 471).

Deep Creek district of Vernal coal field, Wasatch and Uinta counties, Utah. Geologic report of work done by C. T. Lupton in 1910 submitted (in Bulletin 471).

Sunnyside quadrangle, Carbon County, Utah. Frank R. Clark, in conjunction with a topographic party, examined in great detail 230 square miles. Geologic report in preparation.

Coalville coal field, Summit County, Utah. C. H. Wegemann examined in detail 70 square miles of coal land. Land classified.

Raton Mesa coal region, Colfax County, N. Mex., and Las Animas County, Colo. A comprehensive report on the stratigraphy of this region, by W. T. Lee, with descriptions of fossil plants, by F. H. Knowlton, is nearing completion. This report is the result of work done during this and previous seasons in the Raton Mesa region and also in several small coal fields of New Mexico.

Tijeras coal field, Bernalillo County, N. Mex. Geologic report submitted (in Bulletin 471) by W. T. Lee.

Sliver Peak coal field, Esmeralda County, Nev., examined by J. H. Hance. Land classified and geologic report prepared.

Kern River oil field, Kern County, Cal., examined by geologic party in charge of R. W. Pack, under the direct supervision of Robert Anderson. The work embraced the examination not only of the Kern River field but also of adjacent territory on the east side of the San Joaquin Valley. Land classified.

South end of San Joaquin Valley, Cal. Preliminary report on the geology and possible oil resources (in Bulletin 471) prepared by Robert Anderson, as a result of field work of previous years.

Diablo Range, Cal. Geologic report on possible oil resources nearly completed by Robert Anderson, based on field work of previous seasons.

Pawnee, Otoe, Ponca, Kaw, and Tonkawa Indian reservations oil field, Okla. Reconnaissance examination made by R. H. Wood in spring of 1912. Report submitted (for Bulletin 531).

SUBSECTION OF FUELS EAST OF THE NINETY-SEVENTH MERIDIAN.

Work of chief of subsection.—David White held conferences and made examinations in the field with the cooperative parties, both Federal and State, engaged in the survey of the Waterloo, Milan, Carlyle, Okawville, and New Athens quadrangles, in Illinois; with the State geologist and field parties mapping the Missouri coal field and the Leavenworth quadrangle, the latter partly in Kansas; with those in the Vinita, Nowata, Claremore, and Shawnee quadrangles, in Oklahoma; those in the Pikeville, Crossville, and Rockwood quadrangles, in Tennessee; and those in the Wayne County oil fields of Kentucky. In these areas Mr. White aided the field geologists in correlation and in paleobotanic determinations of age.

Field paleontologic studies for correlating and grouping geologic formations were also made by Mr. White in Pawnee, Oklahoma, Logan, Atoka, and Pushmataha counties, Okla., and in Clay and Wichita counties, Tex.

At the close of the field season Mr. White made a brief examination of the phyllite near Worcester, Mass., to determine its geologic age; also, for the purpose of correlation, a hasty reconnaissance of the conglomerate at Dighton, Mass., to which Mansfield has given the name Dighton conglomerate, and of the series of beds near Dodgeville, Mass, which were included in the Tenmile River beds of Shaler, Woodworth, and Foerste. In addition to performing the administrative and committee work of the section, Mr. White has continued his studies of the regional variations of the Appalachian coals, concerning which he is preparing a paper. A small amount of

time has been available for examination and report on collections of Paleozoic plants submitted by several geologists.

Northern Appalachian region.—During the year no field examinations have been made of quadrangles in the coal, oil, or gas regions of Pennsylvania, the State Topographic and Geologic Survey Commission having insufficient funds for prosecuting cooperative field investigations.

The Foxburg-Clarion and Claysville folios (Nos. 178 and 180) and a report (Bulletin 454) on the coal, oil, and gas resources of the Foxburg quadrangle have been issued. Bulletins on the oil and gas resources of the Clarion and Sewickley quadrangles, prepared by M. J. Munn and transmitted several years ago by the Federal Survey for publication by the State Commission, have also been issued by the State.

The preparation of reports and folios covering the quadrangles already studied in the coal fields of Pennsylvania has progressed more rapidly since the return to the Federal Survey in March of George H. Ashley, who for nearly two years was State geologist of Tennessee. A bulletin on the economic geology of the Punxsutawney quadrangle has been prepared by him and a folio text for the same quadrangle has been nearly completed. The texts of folios covering the Curwensville and Houtzdale quadrangles are also well advanced. A folio for the Newcastle quadrangle, near the Ohio line in Pennsylvania, is also nearly ready for submission by F. W. De Wolf, whose time has been largely consumed by his duties as director of the State Geological Survey of Illinois. The folios mentioned, which will probably be submitted during the present calendar year, will complete the geologic descriptions and maps of the quadrangles in Pennsylvania that have been geologically surveyed in cooperation with the State.

Southern Appalachian region.—In Tennessee the valley rocks of the Pikeville 15-minute quadrangle have been thoroughly remapped by Charles Butts, in accordance with the most recent and complete differentiation and classification attained in other areas lately subjected by E. O. Ulrich and G. H. Girty to special paleontologic investigation. With the assistance of W. A. Nelson, of the Tennessee Geological Survey, with which the work was done in cooperation, Mr. Butts also mapped the geology of the Crossville quadrangle, besides making some reconnaissance examinations for the purpose of establishing more conclusively the identity between some of the sandstones of the Crossville quadrangle and those in the Standingstone and Briceville quadrangles described by Messrs. Campbell and Keith. In December, at the request of the State geologist, the services of E. Russell Lloyd were lent by this Survey to the State to make a detailed study of the geology of a tract known as the Herbert

domain, belonging to the State and located partly in the Pikeville 15-minute and Crossville quadrangles. The entire expense of the work was borne by the State of Tennessee.

The oil and gas developments over a large portion of Tennessee were examined by Mr. Munn, who under a cooperative agreement with the State Survey prepared short reports on the pools near Memphis and along Spring Creek in Overton County. These reports have been transmitted to the State geologist and published by the State.

In continuance of the oil and gas investigations earlier begun in co-operation with the Kentucky Geological Survey, Mr. Munn extended his examinations of the oil and gas pools of Wayne and Menifee counties and of the Ragland oil pool, in Bath and Rowan counties. A report by him on the oil and gas resources of Wayne County has been submitted for publication by the State. Preliminary reports on the Menifee, Bath, and Rowan County fields have been submitted for publication in Bulletin 531. Mr. Munn has in preparation also a general summary report describing the oil and gas developments of the southern Appalachian region.

The geology of the Cambrian and Ordovician formations in the Bessemer, Vandiver, and Columbiana quadrangles in Alabama was in June critically revised by Charles Butts, mainly to introduce a more exact and complete classification of the rocks. Two folio texts, covering the Bessemer and Vandiver quadrangles and the Montevallo and Columbiana quadrangles, have been prepared by Mr. Butts.

Central States.—In the Illinois coal field, where geologic surveying has for several years been in progress under cooperative agreements, E. W. Shaw has mapped the New Athens, Okawville, and Carlyle quadrangles and has revised the mapping of the Pleistocene formations of several other quadrangles surveyed by the State. He has submitted a folio text covering the New Athens and Okawville quadrangles and has written an economic report on the oil pools of the Carlyle quadrangle, which has been submitted for publication by the State.

In addition to performing the work above mentioned Mr. Shaw has arranged for folio publication a geologic report on the Belleville and Breese quadrangles. Jointly with A. C. Trowbridge, representing the State Survey, he has also prepared texts and maps for the Galena-Elizabeth folio and a State educational bulletin on the Galena-Elizabeth district.

In Iowa that portion of the Galena quadrangle lying west of Mississippi River has been geologically mapped at Federal expense by Mr. Shaw in order to acquire the data requisite for the completion of the Galena-Elizabeth folio.

The reconnaissance examination of the coal field of Missouri, begun in May, 1910, has been completed. In this work, which has been

carried on in cooperation with the State Bureau of Geology and Mines, Henry Hinds, the representative of the Federal Survey, has had for varying periods the assistance, in behalf of the State, of F. C. Greene, M. Albertson, and M. E. Wilson. Since the close of the field season in 1911 Mr. Hinds and Mr. Greene have been engaged in preparing a comprehensive economic report treating the entire coal field of Missouri by counties. This large and important report is now practically ready for transmission to be published by the State. In addition to the work more particularly of an economic nature, the Federal Survey has assisted in a reconnaissance examination of the upper Pennsylvanian rocks in the northwestern part of Missouri. The results of the work above described will be incorporated in a new geologic map to be issued by the State.

The detailed cooperative survey of a portion of the State of Missouri by quadrangles was begun in the summer of 1911 with the geologic mapping of the Leavenworth quadrangle, a portion of which lies in Kansas. In accordance with the plan for continuing the cooperation, the State began in June the detailed geologic investigation and mapping of the Queen City quadrangle.

In the region of the red beds of southwestern Oklahoma a very brief reconnaissance inspection was made in April by D. F. Hewett to determine whether the exposure of the beds and other conditions in that region are such as to encourage undertaking special structural studies of a kind particularly adapted to aiding the development of oil and gas resources.

WORK OF COMMITTEE ON GEOLOGIC NAMES.

The committee on geologic names was composed of Arthur Keith (chairman), M. R. Campbell (vice chairman), W. C. Alden, W. C. Mendenhall, F. L. Ransome, T. W. Stanton, G. W. Stose, and David White, until March 15. On that date Mr. Keith resigned from the chairmanship on account of pressure of other work and was succeeded by Mr. Stanton. On May 22 Mr. Mendenhall was succeeded by G. H. Ashley. The clerical work of the committee is performed by one clerk, Miss M. G. Wilmarth, who is designated as the secretary.

According to the Director's instructions of January 30, 1909, "It is the duty of the committee on geologic names to consider all geologic names used by members of the Geological Survey in both official and unofficial publications. When manuscripts are received by the committee they shall be examined as soon as practicable and the committee shall decide whether the names employed are permissible or not."

The chief objects of the committee are to insure uniformity in geologic classification and nomenclature in Survey publications, to prevent unnecessary duplication of geologic names, and to reduce if

possible the number of names employed, through correlation of the formations from one area to another. The main criteria on which the decisions of the committee are based are priority of publication, significance acquired by usage, and adequacy of definition and type locality. No one of these criteria is relied on to the exclusion of the others.

The records of the committee comprise (1) a catalogue of geologic names considered by the committee, arranged alphabetically, the action taken for each manuscript being recorded; (2) a catalogue of American geologic names in the literature, also arranged alphabetically, each published description of a formation being recorded (this catalogue is the work of J. M. Nickles, of the library staff); (3) a catalogue of the geologic names in the literature, arranged by States; (4) a catalogue of geologic columnar sections approved by the committee, arranged by States, the area to which each columnar section applies being located on the appropriate State map; and (5) a catalogue of geologic columnar sections in the United States, classified by States, compiled from existing literature, the areas being located on a set of State maps. The last catalogue is not complete but is being brought up to date as rapidly as possible. It is designed to prevent unnecessary duplication of geologic names. All these records, except as noted above, have been prepared and are kept up to date by the secretary of the committee.

The amount of labor and research which devolves upon the committee can be understood from the statement that during the last fiscal year it considered 143 manuscripts, comprising a total of 21,614 pages and about 5,000 geologic names. These manuscripts discussed the geology of all parts of the United States.

DIVISION OF ALASKAN MINERAL RESOURCES.

CLASSES OF WORK.

The work of the division of Alaskan mineral resources was carried on under an appropriation of \$100,000 for "continuation of the investigation of the mineral resources of Alaska." Under this authority, as in previous years, work of the following classes was carried on: Reconnaissance and detailed geologic surveys; special investigations of mineral resources; reconnaissance and detailed topographic surveys; investigation of water resources with reference to the supply available for placer mining; and collection of statistics on mineral production.

PERSONNEL.

The personnel of the division varied somewhat during the year on account of transfers of employees to and from other divisions and on account of temporary employment of technical assistants. On July 1, 1911, there were employed in the division 1 geologist in

charge, 10 geologists, 4 topographers, 2 engineers, 3 clerks, and 1 draftsman on annual salaries, 2 geologic field assistants, and 25 camp hands and recorders. On June 30, 1912, the personnel of the division included 1 geologist in charge, 11 geologists, 4 topographers, 2 engineers, 1 draftsman, and 3 clerks on annual salaries, 1 geologist and 1 clerk on per diem salary, and 2 geologic field assistants. One geologist, employed for six months during the year, is not included in the above enumeration.

FIELD OPERATIONS IN SEASON OF 1911.

Allotments and areas covered.—Thirteen parties were engaged in surveys and investigations in Alaska during the season of 1911 for varying periods between April 20 and October 26. In addition to these the geologist in charge spent a part of the summer in Alaska carrying on geologic investigations and visiting field parties.

During the year 14,460 square miles were covered by reconnaissance topographic surveys (on a scale of 1:250,000) and 246 miles by detailed topographic surveys (on a scale of 1:62,500). Detailed geologic surveys were made of 496 square miles and geologic reconnaissance surveys of 10,550 square miles. In addition to this 8,000 square miles were covered by exploratory geologic surveys. Most of the geologists also spent considerable time in studying special problems connected with the mineral deposits. The investigation of the water supply in placer districts covered an area of approximately 8,000 square miles and included the maintenance of 68 gaging stations and 309 measurements of stream volume. Twelve of the thirty mining districts of Alaska which are being developed were visited by members of the staff. The following table shows the allotment of the appropriation to the different districts of Alaska. These figures include the cost of both field and office work, as well as inspection.

Allotment to Alaskan surveys and investigations in 1911.

Copper River region	\$18, 500
Prince William Sound.....	4, 800
Kenai Peninsula.....	24, 500
Susitna basin.....	5, 100
Yukon basin.....	23, 700
Noatak region	11, 700
Northeastern Alaska	5, 500
General investigations.....	6, 200
	100, 000

In the following table the approximate amount of money devoted to each class of investigations and surveys is indicated. It is not possible to give the exact figures, as the same party or even the same men may have carried on two different kinds of work, but this state-

ment will help to elucidate a later table which will summarize the complete areal surveys:

Approximate allotments to different kinds of surveys and investigations in 1911.

Geologic exploration	\$5, 200
Geologic reconnaissance surveys	37, 600
Special geologic investigations	7, 500
Topographic reconnaissance surveys	25, 500
Detailed topographic surveys	4, 700
Investigation of water resources	6, 500
Collection of statistics of mineral production	1, 100
Miscellaneous, including clerical salaries, administration, inspection, instruments, office supplies, and equipment	11, 900
	100, 000

Allotment for salaries and field expenses, 1911.

Scientific and technical salaries	\$34, 860
Field expenses	55, 440
Clerical and other office salaries	9, 700
	100, 000

The following table exhibits the progress of investigations in Alaska and the annual grant of funds since systematic surveys were begun in 1898. It should be noted that an unclassified amount—varying from year to year—is expended each year on special investigations that yield results which can not be expressed areally.

Progress of surveys in Alaska, 1898-1911.^a

Year.	Appropriation.	Area covered by geologic surveys.			Area covered by topographic surveys. ^b					Water-resources investigations.	
		Exploratory (scale 1:625,000 or 1:1,000,000).	Reconnaissance (scale 1:250,000).	Detailed (scale 1:62,500).	Exploratory (scale 1:625,000 or 1:1,000,000).	Reconnaissance (scale 1:250,000, 200-foot con- tours).	Detailed (scale 1:62,500; 25, 50, or 100 foot con- tours).	Lines of levels.	Bench marks set.	Gaging stations maintained part of year.	Measurements of stream volume.
1898.....	\$46, 189. 60	<i>Sq. m.</i> 9, 500	<i>Sq. m.</i>	<i>Sq. m.</i>	<i>Sq. m.</i> 12, 840	<i>Sq. m.</i> 2, 070	<i>Sq. m.</i>	<i>Miles.</i>			
1899.....	25, 000. 00	6, 000			8, 690						
1900.....	60, 000. 00	3, 300	6, 700		630	11, 150					
1901.....	60, 000. 00	6, 200	5, 800		10, 200	5, 450					
1902.....	60, 000. 00	5, 950	10, 050		8, 330	11, 970	96				
1903.....	60, 000. 00	5, 000	8, 000	96		15, 000					
1904.....	60, 000. 00	4, 050	3, 500		800	6, 480	480	86	19		
1905.....	80, 000. 00	4, 000	4, 100	536		4, 880	787	202	28		
1906.....	80, 000. 00	5, 000	4, 000	421		13, 500	40			14	286
1907.....	80, 000. 00	2, 600	1, 400	442		6, 120	501	95	16	48	457
1908.....	80, 000. 00	2, 000	2, 850	604		3, 980	427	76	9	53	556
1909.....	90, 000. 00	6, 100	5, 500	450	6, 190	5, 170	444			81	703
1910.....	90, 000. 00		8, 635	321		13, 815	36			69	429
1911.....	100, 000. 00	8, 000	10, 550	496		14, 460	246			68	309
	971, 000. 00	68, 700	71, 085	3, 366	47, 680	114, 045	3, 057	459	72		
Percentage of total area of Alaska.....		11. 72	12. 12	0. 57	8. 16	19. 45	0. 52				

^a The areas presented in this table differ somewhat from those previously published. This is due in part to the reclassification of the work and in part to the fact that the areas have been more carefully scaled from the maps than formerly.

^b In addition to the above, the International Boundary Survey and the Coast and Geodetic Survey have made surveys of parts of Alaska.

General investigations.—The geologist in charge was employed in office work until August, when he proceeded to Seattle and joined the party of the Secretary of the Interior. Details in regard to the itinerary of the Secretary's party have been published elsewhere, and it will therefore be sufficient to state here that parts of the Bering River coal field and of the Katalla oil field were visited and that the itinerary included journeys over the Copper River, Alaska Northern, and White Pass railways, down Lewis River to Lake Labarge, and over about 15 miles of the Valdez-Fairbanks military road. The geologist in charge left the party at Skagway on September 4 and proceeded to Juneau, where he spent two days in visiting some of the mines. Thence he returned to Valdez and devoted 10 days to a rapid reconnaissance of a part of the Port Valdez mining district. He reached Seward on September 24 and spent 10 days in studying the geology and mineral resources of a part of Kenai Peninsula, in company with Mr. Johnson and Mr. Martin. Conferences were also held in regard to topographic surveys with Mr. Sargent and Mr. Bagley. Returning, Mr. Brooks reached Seattle on October 15, proceeded to San Francisco to meet the Director, and, after attending the meeting of the American Mining Congress at Chicago, returned to Washington, arriving on October 28.

R. H. Sargent continued the general supervision of the topographic surveys and map compilation, in addition to carrying on his own field work. J. W. Bagley spent considerable time in devising methods and instruments for phototopographic surveys. These were successfully applied by him in his field work.

E. M. Aten continued to act as office assistant to the geologist in charge and supervised the office work while the geologist in charge was in the field. He also continued to assist in collecting the statistics of production of precious metals in Alaska.

Arthur Hollick, who was employed for six months, continued his study of the fossil flora of the coal measures of Alaska. W. W. Atwood also continued some office studies bearing on the coal resources of Alaska.

Southeastern Alaska.—Systematic surveys and investigations were begun in southeastern Alaska in 1901 and continued each season until 1910. The demands for surveys in other parts of the Territory prevented any further work in this province in 1911. This was unfortunate, for while the preliminary examination of much of this area has been completed and detailed surveys of the most important mining districts have been made, there is still great need for reconnaissance surveys which shall outline more definitely the geologic formations and thus furnish further evidence on the distribution of mineral resources.

Some office work was done during the year on a report treating of the region about Glacier and Lituya bays, by F. E. Wright.

C. W. Wright still has in hand the report on the copper deposits of the Kasaan Peninsula and Copper Mountain regions. His professional duties in Sardinia have prevented the completion of this report as early as he had hoped.¹

Copper River region.—D. C. Witherspoon was assigned to the work of extending the reconnaissance survey southward from Hanagita Valley to the Bremner River region and revising the map of the lower Copper River valley. The party under his charge revised the mapping of an area of 900 square miles and surveyed a new area of 1,000 square miles, for publication on a scale of 1:250,000. Mr. Witherspoon also occupied some 20 triangulation stations which form part of a scheme for a system of triangulation from Copper Center to Chitina and from Chitina to the head of Bremner River.

F. H. Moffit, assisted by Theodore Chapin, made a geologic reconnaissance survey of about 1,500 square miles in the Hanagita Valley and Bremner River region. His party also examined the copper lodes and gold-placer prospects of the region.

Prince William Sound.—J. W. Bagley, assisted by C. E. Giffin, made a detailed topographic survey of the most important part of the Port Valdez mining district. Work in this district was begun on April 25 and continued until July 21, when the party was transferred to Kenai Peninsula. This survey was made by phototopographic methods. It covered an area of 160 square miles, for publication on a scale of 1:62,500, with 50-foot contours. A geologic reconnaissance of this area has already been made by A. H. Brooks. (See p. 75.)

Kenai Peninsula.—R. H. Sargent carried a topographic reconnaissance survey from Kachemak Bay northward to Turnagain Arm. The work included the revision and original mapping of part of the Sunrise placer district, and later the survey of the drainage basin of Resurrection River, near Seward. In all, an area of 3,100 square miles was surveyed, besides which the mapping of about 600 square miles was revised for publication on a scale of 1:250,000, with 200-foot contours.

J. W. Bagley, who began work in Kenai Peninsula on July 25 and continued it, so far as weather permitted, until October 13, made detailed topographic surveys of an area of 86 square miles (scale 1:62,500) in the Moose Pass region and also covered some 360 square miles by reconnaissance surveys, besides revising the mapping of an area of 170 square miles. These surveys were made by phototopographic methods.

G. C. Martin, assisted by Harmon Lewis, carried a geologic reconnaissance northward from Port Graham to Kenai River, thence eastward to the Alaska Northern Railway. In addition, Mr. Martin made some special geologic investigations in other parts of the

¹ Mr. Wright has submitted his report since the close of the fiscal year.

peninsula. The Martin party mapped an area of 800 square miles on a scale of 1:250,000.

B. L. Johnson was assigned to the study of the developments of auriferous lodes in the northern half of Kenai Peninsula. He made a more or less detailed examination of most of the important lodes and gold placers of this district and mapped the geology of the area covered by Mr. Bagley's survey in the Moose Pass region.

Susitna basin.—S. R. Capps completed a geologic reconnaissance of the Yentna placer district. The area covered was about 2,000 square miles, and the work included the examination of all the important gold placers of the district.

Yukon basin.—L. M. Prindle, assisted by J. B. Mertie, completed the areal reconnaissance mapping of the larger part of the Circle quadrangle, covering an area of about 4,000 square miles. Mr. Prindle also made a study of the placers of Fourth of July Creek.

Henry M. Eakin completed the geologic reconnaissance mapping of the part of the Rampart quadrangle previously covered by topographic surveys. He also carried the work west of the Yukon, over a previously unmapped area, of which some topographic sketch maps were made. The Eakin party mapped an area of about 2,000 square miles and also examined the gold placers of the Rampart, Hot Springs, and Gold Mountain districts.

The investigation of the water resources of the Yukon-Tanana region, which was begun at Fairbanks in 1907, was continued. E. A. Porter carried on investigations in the Fortymile district, where 27 gaging stations were maintained for 17 weeks and 80 measurements were made; in the Eagle district, where 6 stations were maintained for 15 weeks and 28 measurements made; and in the Seventymile district, where 9 stations were maintained for 14 weeks and 46 measurements made. C. E. Ellsworth worked in the Birch Creek district, where 15 stations were maintained for an average of 15 weeks and 78 measurements were made; in the Fairbanks district, where 10 stations were maintained for an average of 15 weeks and 74 measurements made; and in the Salchaket district, where 1 station was maintained for 15 weeks and 3 measurements were made.

Northeastern Alaska.—By courtesy of the boundary commissioner, Mr. O. H. Tittmann, the Survey was enabled to attach a geologist to the party which was engaged in surveying the boundary north of Porcupine River. A. G. Maddren, assisted by J. M. Jessup, was detailed for this work. Field work began on the Porcupine and was extended northward. Topographic maps prepared by the boundary surveyors (scale 1:45,000) were used as a base, and the areal mapping covered about 400 square miles; in addition to which about 200 square miles were mapped in a reconnaissance way.

Northwestern Alaska.—P. S. Smith, with C. E. Giffin, topographer, carried an exploration up Alatna River, across the divide to the

Noatak, and down that river to the Arctic Ocean at Kotzebue Sound. An area of about 10,000 square miles was mapped topographically, and the principal geologic features of about 8,000 square miles of this area were mapped.

Collection of statistics.—The work of collecting statistics of the annual production of gold, silver, and copper in Alaska, begun in 1906, was continued during the year. The progress report for 1910 was completed in April, 1911, and published as Bulletin 480. This report contained the preliminary figures on mineral production, which were changed but little when the final figures were transmitted in August for inclusion in the Survey's annual volume "Mineral resources of the United States" for the calendar year 1910. The preliminary figures for mineral production in 1911 are included in the progress report for 1911, transmitted in June, 1912, and now in press as Bulletin 520.

FIELD OPERATIONS FOR SEASON OF 1912.

For many years the appropriation for continuing the investigation of the mineral resources of Alaska has been included in the annual urgent deficiency bill, and usually the money has been available not later than the 1st of February, so that parties have been dispatched to the remote parts of Alaska with the assurance that funds were available for continuing their work throughout the field season. Without such assurance the entering upon expensive field work would not be justified. In 1912, unfortunately, the Alaska item was put in the sundry civil bill, and the funds did not become available until after June 30. This condition has made necessary an entire change of field plans. Though supplies had been dispatched at heavy expense to Valdez Creek, to be used by parties which should extend surveys into the Broad Pass region, these surveys had to be abandoned because of the uncertainty of the appropriation. Other projected surveys in the Susitna and Matanuska basins also had to be given up.

The funds available until June 30 made it possible only to take up some of the more urgent work. A. G. Maddren was sent to continue geologic work north of the Porcupine in cooperation with the boundary survey parties. C. E. Ellsworth and R. W. Davenport were dispatched to continue stream gaging in the Yukon-Tanana region. In cooperation with the National Geographic Society, G. C. Martin undertook a study of the recent volcanic eruption in the Alaska Peninsula. H. M. Eakin left for the Ruby Creek district, in the Yukon basin, about the end of the fiscal year. No other surveys or investigations were possible before June 30.

OFFICE WORK.

During the year two professional papers (Nos. 69 and 70) and six bulletins (Nos. 448, 467, 480, 485, 500, and 504) relating to Alaska

have been issued. Three separates of parts of Bulletin 520 have also been published. Three bulletins (Nos. 498, 501, and 502) are in press. All these publications contain topographic maps. There have also been issued as sale publications two detailed topographic maps, those of Copper Mountain and vicinity and Kasaan Peninsula.

The following reports have been completed and illustrations for them are being prepared:

Coastal glaciers of Prince William Sound and Kenai Peninsula, by U. S. Grant and D. F. Higgins. (Bulletin 526.)

The surface water supply of Seward Peninsula, by F. F. Henshaw and G. L. Parker; with sketch of geography and geology, by P. S. Smith, and placer mining, by Alfred H. Brooks; including topographic reconnaissance map (Water-Supply Paper 314.)

A geologic reconnaissance of the Fairbanks quadrangle, Alaska, by L. M. Prindle; with a detailed description of the Fairbanks district, by L. M. Prindle and F. J. Katz; including detailed and reconnaissance geologic and topographic maps. (Bulletin 525.)

In addition to these the following reports have been submitted during the year:

Geology of the Nome and Grand Central quadrangles, by F. H. Moffit; including detailed geologic and topographic maps.

The Hanagita-Bremner region, by F. H. Moffit; including reconnaissance geologic and topographic maps.

The Yentna district, by S. R. Capps; including reconnaissance geologic and topographic maps.

The Rampart quadrangle, by H. M. Eakin; including reconnaissance geologic and topographic maps.

The following reports are in hand:

Geology and ore deposits of Kasaan Peninsula and the Copper Mountain region, Prince of Wales Island, by C. W. Wright; including detailed geologic and topographic maps.

Geology of Glacier Bay and Lituya region, by F. E. Wright and C. W. Wright; including reconnaissance geologic maps.

Kenai Peninsula, by G. C. Martin, B. L. Johnson, and U. S. Grant; including reconnaissance geologic and topographic maps.

The Koyukuk-Chandalar gold region, by A. G. Maddren; including reconnaissance geologic and topographic maps.

The Iditarod-Innokko region, by A. G. Maddren; including reconnaissance geologic and topographic maps.

The Circle quadrangle, by L. M. Prindle, including reconnaissance geologic and topographic maps.

The Noatak-Kobuk region, by Philip S. Smith; including reconnaissance geologic and topographic maps.

The following maps have been completed during the year and will be published as illustrations to reports:

Reconnaissance map of the Chitina quadrangle, by D. C. Witherspoon, T. G. Gardine, and E. G. Hamilton; scale, 1:62,500; contour interval, 200 feet.

Reconnaissance map of the Koyukuk-Chandalar region, by T. G. Gardine, D. C. Witherspoon, and A. G. Maddren; scale, 1:500,000; contour interval, 200 feet.

GEOLOGIC RESULTS.

Mr. Moffit's investigations in the Bremner River region show that the series of sediments which have been assigned to the Valdez group include Carboniferous and Mesozoic rocks. In Kenai Peninsula Mr. Martin and Mr. Johnson have found that Jurassic rocks are included in the Sunrise group, heretofore regarded as chiefly Paleozoic. Mr. Brooks found two excellently defined systems of fissuring in the Port Valdez region, and similar systems were found by Mr. Johnson in the northern part of Kenai Peninsula, where Mr. Johnson also discovered a close connection between igneous intrusion and auriferous mineralization. A similar relation between intrusion and mineralization was noted by Mr. Capps in the Yentna placer district, where, too, Mr. Capps found a heavy series of Tertiary gravels resting conformably on Eocene coal measures. These Tertiary beds are in turn overlain by glacial deposits. This goes to show that the heavy gravel sheet of this district, formerly believed to have been deposited during the retreat of the ice, is of preglacial age.

In the Rampart region Mr. Eakin was able to segregate a series of Mesozoic sediments which had formerly been grouped with the Paleozoic. While mapping the Circle district Mr. Prindle found some Quaternary lavas and also evidence of a small amount of local glaciation. Mr. Maddren divided the rocks along the international boundary north of the Porcupine into four groups, as follows: (1) Quartzites, phyllites, and slates (pre-Ordovician); (2) heavy limestone, with some shale, sandstone, and chert (Carboniferous); (3) sandy and calcareous shales (Triassic); (4) quartzites and slates, with some conglomerates (Mesozoic?). There is also considerable granite (Mesozoic?) in this region.

In northwestern Alaska the facts of most general geologic interest contributed by the geologic survey of the Alatna-Noatak region made by P. S. Smith included the finding of small existing glaciers in the headwaters of Alatna and Noatak rivers, the collection of Carboniferous fossils from ledges at several places in the Noatak Valley, and the determination from fossils found in float that Triassic rocks occur within the Noatak basin.

DIVISION OF MINERAL RESOURCES.

The scope of the work of the division of mineral resources during the fiscal year 1912 has been practically the same as that of the preceding year. The statistical work of the division was authorized by the act of August 7, 1882. The earlier reports contain chiefly statistical estimates prepared by experts on the subjects treated, together with more or less extended reviews of market conditions and of supply and demand, with special contributions on mining localities,

mining methods, and technical progress. During more recent years most of the chapters comprised in the reports have been prepared by geologists of the Survey who have specialized in the subjects treated by them, with a view to carrying out the provision of the organic act which directs the Geological Survey to classify the public lands and examine the geologic structure, mineral resources, and products of the national domain. This plan has brought eminently satisfactory results, in that it gives to the statistical work the benefit of the cooperation of the geologist trained in economic work and, on the other hand, gives to the geologist the opportunity to study the industrial and commercial conditions which affect the demand for the minerals. No less attention has been given to the statistical phase in these later years, but more comprehensive studies have been made of the sources of the mineral production and the application of the products in the useful arts. The volumes have in this way grown into a cyclopedia of information concerning the mineral resources of the United States. Knowledge of the storehouses from which the future supplies are to be drawn is considered to be of prime importance—of greater value, indeed, than the record of past mining achievement which is presented in the statistical compilations.

Recent volumes have contained general maps showing the areas producing coal, the precious and semiprecious metals, iron ore, petroleum, natural gas, cement materials, gypsum, salt, and various other minerals, with brief descriptive notes. The report for 1911 will contain maps showing the localities producing the different kinds of building stones in the Eastern States. These will be followed by similar maps showing the areal distribution of building materials. There is also in preparation a chapter on the useful minerals of the United States. This will contain brief descriptions of the minerals and the localities in which they occur and indicate whether or not they are at present mined or are still undeveloped.

The plan of cooperation between the Geological Survey and certain State surveys in collecting mineral statistics continued in force in connection with the report for 1911. The 18 States which cooperated were Alabama, Georgia, Illinois, Iowa, Kansas, Kentucky, Maryland, Michigan, Missouri, New Jersey, North Carolina, Oklahoma, Oregon, Pennsylvania, Texas, Virginia, Washington, and Wisconsin. As this cooperation becomes better appreciated, both by the Federal Survey and the State surveys, and is better understood by the producers, it works more and more smoothly. Its results in 1911 were the most satisfactory yet obtained. The plan obviates a duplication of a considerable amount of work and saves the producers the annoyance of preparing two sets of statistical reports.

During the fiscal year the work of the division consisted of the preparation of reports on the mineral production of the United States in the calendar years 1910 and 1911. The report for 1909, which had been delayed on account of the cooperative arrangement with the Bureau of the Census, was issued during the early part of the fiscal year 1911. The report for 1910 was published early in the calendar year 1912, and the work on the report for 1911 was well advanced at the close of the fiscal year. Thus work on three different reports on the mineral resources of the United States was carried on during the fiscal year 1912. Although the report for 1910 was not completed until early in the calendar year 1912, the separate chapters on all of the subjects except three were published during the calendar year 1911. The following table gives the estimated percentage of schedules returned at the close of the fiscal years (June 30) 1909, 1910, 1911, and 1912 for some of the more important products, the period covered by the returns being the preceding calendar year:

Percentage of schedules returned from producers at the end of fiscal years 1909, 1910, 1911, and 1912.

Industry.	1909	1910	1911	1912
Building stone.....	97	26	90	95
Clay working.....	98	35	95	100
Coal.....	98	26	99	100
Coke.....	100	15	100	100
Iron ore.....	100	24	100	100
Natural gas.....	90	43	80	95

Preliminary estimates of the production of coal, cement, copper, lead, zinc, gold, silver, petroleum, quicksilver, and tungsten in 1911, with reviews of the conditions which prevailed during the year, were given to the press in the form of special press bulletins late in December, 1911, and in January and February, 1912.

Advance statements giving the official figures covering the production of copper, lead, and zinc, in 1911, have also been published. Advance chapters from the report for 1911 on the following subjects (30 in all) have been published or are in press at the close of the fiscal year: Potash salts, asbestos, bauxite and aluminum, talc and soapstone, graphite, sulphur and pyrite, salt, monazite and zircon, iron-ore reserves of Michigan, sand-lime brick, mica, phosphate rock, fuller's earth, quicksilver, cement, abrasive materials, precious stones, gypsum, chromite, borax, magnesite, tin, salt and bromine, asphaltum, pottery, anthracite coal, fuel briquetting, gold and silver in the Eastern States, iron ore and pig iron, and manganese ores.

The number of employees in Washington who devote their entire time to the work of the division of mineral resources is 28, and 8 persons are employed in the offices of the division outside of Washington, at Salt Lake City, Denver, and San Francisco. In addi-

tion to these, 19 members of other divisions of the Survey, chiefly geologists, devote a portion of their time to the work of the division of mineral resources, making a total of 55 connected with this work.

During the year 164,490 pieces of first-class mail matter (chiefly statistical inquiries) were sent out by the division and 61,109 pieces were received.

Edward W. Parker continued as administrative head of the division, and Waldemar Lindgren exercised supervision over the preparation of chapters on metalliferous ores and a report on platinum. In addition to his administrative duties Mr. Parker prepared reports on the production of coal, the manufacture of coke, and the briquetting industry. E. S. Bastin was in charge of the preparation of the report on graphite; E. F. Burchard, cement, fluorspar and cryolite, glass sand, etc., gypsum, iron ore, lime, manganese, and stone; B. S. Butler, copper; A. T. Coons, slate; D. T. Day, asphalt and bituminous rock, natural gas, and petroleum; J. S. Diller, asbestos and talc and soapstone; J. P. Dunlop, lead and zinc in the Central States and secondary metals; H. S. Gale, borax, magnesite, and nitrates; F. L. Hess, antimony, arsenic, nickel and cobalt, etc., and tin; H. D. McCaskey, gold, silver, and copper in the Central and Eastern States and quicksilver; G. C. Matson, mineral waters; Jefferson Middleton, clay, clay-working industries, fuller's earth, quartz and feldspar, and sand-lime brick; W. C. Phalen, abrasive materials, barytes, bauxite and aluminum, chromite, mineral paints, potash salts, salt and bromine, sodium salts, strontium, and sulphur and pyrite; C. E. Sieben-thal, lead and zinc; D. B. Sterrett, gems and precious stones, mica, and monazite and zircon; W. T. Thom, summary of the mineral production; and F. B. Van Horn, phosphate rock. In addition to preparing his reports, Mr. McCaskey has exercised general supervision of the offices of the division in the Western States. These offices are under the direct charge of the following persons: Denver, C. W. Henderson; Salt Lake City, V. C. Heikes; San Francisco, C. G. Yale.

DIVISION OF CHEMICAL AND PHYSICAL RESEARCH.

During the fiscal year the chemical laboratory reported 388 quantitative analyses and 778 qualitative determinations, chiefly of minerals sent for examination by persons not connected with the Survey.

George F. Becker, the geologist in charge of the division, has been engaged chiefly in studying the effect of radioactivity on the cooling of the earth. He contrived a new device for determining the viscosity of liquids and spent some time in consultations on the effect of electrolytic action due to difference of potential of sulphides on the decomposition of ores. He also completed a paper showing that the formulas of "imaginary geometry" are applicable to the study of rock strains.

F. W. Clarke supervised the publication of the new edition of his "Data of geochemistry" (Bulletin 491) and also prepared a paper on geochemical statistics.

George Steiger was occupied with routine quantitative analyses and experimental work to show the exact conditions to be observed in the colorimetric determination of manganese.

Chase Palmer made a number of analyses of rocks and minerals and did research work on a selenide mineral containing gold. His paper entitled "The geochemical interpretation of water analyses" was published as Bulletin 479.

R. C. Wells analyzed some rocks from the Canal Zone and other localities and did research work on the fractional precipitation of silicates and hydroxides.

W. T. Schaller made numerous chemical and mineralogical determinations and quantitative rock analyses, including the description of several new mineral species. His "Mineralogical notes," series 1 and 2, were published as Bulletins 490 and 509 of the Survey. Mr. Schaller resigned from the Survey March 31 for the purpose of studying abroad, and Walter F. Hunt, of Ann Arbor, Mich., was appointed to fill temporarily the vacancy caused by his resignation.

J. G. Fairchild analyzed phosphate rocks, limestones, and some minerals and also elaborated and published a method for determining phosphoric acid in phosphate rock.

The work in the physical laboratory, under the direction of C. E. Van Orstrand, has continued along the same lines as heretofore, except that the experiments on elasticity and plasticity have been discontinued temporarily pending the appointment of an assistant. The experiments on the diffusion of solids have been continued throughout the year, and the scope of the investigation has been extended to include a study of the variation of diffusion with both pressure and temperature. Two mathematical tables have been completed. The first consists of sixteen hundred 18-place values of the circular sine and cosine, and the second consists of twenty-five hundred 10-place values of the inverse gudermannian, each to radian argument. A table of the ascending exponential has been begun. A portion of the table on the probability integral will be ready for publication in a few months.

LAND-CLASSIFICATION BOARD.

ORGANIZATION.

The land-classification board began the fiscal year 1911-12 with the organization and the personnel of the preceding fiscal year. Changes have since been effected through reorganization, resignations, and new appointments, so that at the end of the year the board, now a definitely organized branch of the Geological Survey,

has a staff of 30 permanent employees. Of this number 12 are professional workers, either geologists or engineers of the various grades, 4 are technical, and 14 are clerical or subclerical. In addition to these, temporary or occasional service has been rendered by about 22 others, of whom 14 are geologists and engineers of the field branches who either have been assigned to the board for short periods or have acted in an advisory capacity as members of the various classification sections. The remaining nonpermanent employees have held technical or clerical appointments.

Much the most important change of the year was that effected by the Director's order of May 1, 1912, by which the status of the board was changed from that of a section in the geologic branch to an independent branch coordinate in responsibilities and functions with the geologic, topographic, and water-resources branches. The new branch, retaining its old name, land-classification board, includes two divisions—that of mineral classification and that of hydrographic classification—and each of these divisions contains a group of sections dealing directly with a particular resource or a particular problem. The branch is organized as follows:

Land-classification board.

Administration.

W. C. Mendenhall, chief of board.

N. C. Grover, chief engineer.

Elsie Patterson, secretary.

Division of mineral classification.

W. C. Mendenhall, geologist in charge.

Coal section—George H. Ashley, chairman.

Oil section—M. W. Ball, chairman.

Phosphate section—A. R. Schultz, chairman.

Metalliferous section—A. R. Schultz, chairman.

Division of hydrographic classification.

N. C. Grover, chief engineer in charge.

Water-power section—W. B. Heroy, chairman.

Irrigation section—Herman Stabler, chairman.

The reorganization made a definite change in the relations of the board to the field branches of the Survey. The order creating the new branch defined its duties as the consideration of questions of Survey policy in matters relating to land classification and the preparation of reports thereon to the Director, and the receiving from other branches and the recording of all data valuable in the administration of the public lands. In the fulfillment of these functions the board prepares all letters or papers relating to the classification of the public lands and the administration of the public domain.

The most important changes in the staff have been the appointment of A. R. Schultz, assistant geologist, as chairman of the phosphate section on August 16, 1911; the resignation of W. R. Calvert, effective on April 1, 1912; and the appointment of George H. Ashley to take the place made vacant by Mr. Calvert's resignation.

Mr. Schultz was at first placed in charge of the phosphate work of the board, which had fallen greatly in arrears because of the inadequacy of the force, and later his authority was extended to include the work of the section on metalliferous deposits.

Mr. Ashley, State geologist of Tennessee for two years prior to his reappointment on the Geological Survey as a member of the land-classification board, replaced Mr. Calvert as chairman of the coal section.

SPECIAL FEATURES.

The work of the board during the last year has in general followed the lines along which its activities have been exercised during the two preceding years. There has been increase in the volume rather than change in the type of work. Orders from the Secretary of the Interior, however, have resulted in some expansion other than that in volume merely. On January 11 and 18 orders were issued that all entries and selections which are not specifically excepted from reservation under the act of June 25, 1910 (36 Stat., 847), and under which a vested right has not accrued should be submitted to the Geological Survey by the Commissioner of the General Land Office for report as to any mineral or power values involved. Under these and earlier orders and cooperative agreements, approximately 12,000 cases of various types, including right-of-way applications and enlarged-homestead petitions, were referred to the Geological Survey during the fiscal year and action was taken on about 10,000 of these. In the special-agent cases and the requests for information from the General Land Office and the Indian Office, which form a very large percentage of the total referred cases, the mineral or power values of the lands are chiefly involved, and in all cases where the Survey's records showed that the lands were nonmineral and had no power or reservoir values the General Land Office was saved the necessity of field examinations.

The value to the department of the orders of January 11 and 18, 1912, is indicated in the fact that in only 292 of the 2,844 cases reported upon by the Survey under these orders since March 1 has it been necessary to recommend examination in the field by the agents of the General Land Office. The time and expense of making such field examinations were saved in the great majority of the remaining 2,552 cases, and even if this represents a higher percentage than will be maintained on the average, the result is a marked saving to the department as a whole and indicates a distinct advance in efficiency.

Action taken on requests for information under cooperative agreement of March 5, 1912.

State.	Re- ceived.	Acted on.						Total.	Pend- ing.
		Min- eral.	Non- min- eral.	Field exam- ination recom- mended (min- eral).	Power.	Non- power.	Field exam- ination recom- mended (pow- er).		
Alabama.....	7			6		6		6	1
Alaska.....	71	1	63		2	23		65	6
Arizona.....	110		38		2	45		47	63
Arkansas.....	5	0	0	0	0	0	0	0	5
California.....	301	4	80	63	2	209	5	227	74
Colorado.....	83	3	27	0	1	58	0	64	19
Florida.....	31	0	2	0	0	29	0	29	2
Idaho.....	308	0	72	27	0	131	0	132	176
Kansas.....	3	0	2	0	0	2	0	2	1
Louisiana.....	15	0	1	0	0	1	0	1	14
Michigan.....	1	0	1	0	0	1	0	1	
Minnesota.....	77	0	10	0	0	17	0	24	53
Mississippi.....	1	0	0	0	0	0	0	0	1
Montana.....	840	0	177	35	4	366	0	371	469
Nebraska.....	15	0	14	0	0	14	0	14	1
Nevada.....	97	0	0	1	0	3	0	3	94
New Mexico.....	712	1	27	5	0	461	0	462	250
North Dakota.....	69	0	8	0	0	44	0	44	25
Oregon.....	408	1	24	38	7	308	1	318	91
South Dakota.....	8	1	3	0	0	3	0	4	4
Utah.....	410	6	5	0	2	154	0	157	253
Washington.....	382	0	17	19	19	267	0	287	95
Wisconsin.....	9	0	2	0	0	2	0	2	7
Wyoming.....	871	44	384	92	3	579	1	584	287
	a 4,835	61	957	286	42	2,723	7	b 2,844	b 1,991

^a A large number of these cases were received prior to the adoption of the cooperative agreement of Mar. 5, 1912.

^b Certain of these cases are accompanied by reports as to mineral character and are included as mineral cases in the table below, showing the action taken on reports by Land Office field agents during the year.

The table below shows the action taken on reports on the mineral or power value of lands rendered by Land Office field agents during the year and submitted to the Survey for a recommendation of appropriate action.

Work of Land Office field service showing mineral character and power-site and reservoir possibilities of lands.

State.	Pending July 1, 1911.	Received July 1, 1911, to June 30, 1912.	Acted on.			Total acted on.	Pending July 1, 1912.
			Ap- proved.	Part ap- proved.	Disap- proved.		
Arizona.....		18	13			13	5
Arkansas.....		1			1	1	
California.....	18	163	95	1	23	117	64
Colorado.....	40	171	144	1	39	184	27
Florida.....	3	3	2		3	5	1
Idaho.....	14	163	120		41	165	12
Louisiana.....	10	22	41		1	42	
Minnesota.....		24					24
Montana.....	57	529	456	9	87	552	34
Nevada.....	0	42	30		1	31	11
New Mexico.....	1	487	231	2	3	236	252
North Dakota.....	5	179	102		10	112	72
Oregon.....	54	679	589	4	8	601	132
South Dakota.....							
Utah.....	116	451	453	2	11	466	101
Washington.....	3	275	218	3	20	241	37
Wyoming.....	39	149	157	2	12	171	17
	260	3,366	2,649	28	260	2,937	789

In addition to the cases shown in the foregoing table, the Land Office, in compliance with departmental order of April 27, 1911, has requested information as to power-site value in 188 cases involving lands recommended for elimination from national forests or included in restorations of administrative sites, of which number 164 were received during the fiscal year. The Survey has complied with 172 of these requests, and 16 are pending at the end of the fiscal year.

Work has continued throughout the year under the departmental order of March 27, 1911, requiring a report by the Geological Survey as to the mineral character and power or reservoir value of lands included in tribal allotments or proposed town sites on Indian lands. By order of the First Assistant Secretary of August 23, 1911, the preparation of these reports has been made special, although this preference has at times necessitated the neglect of other work. The Indian Office has forwarded 4,876 such requests for data during the year. The Survey has furnished information in 3,385 cases, and 1,494 cases are now pending.

Another feature of the work of the year that is of special interest was the establishment of a new type of reserve by recommending to the department the withdrawal from entry, by presidential action, of certain lands in the arid West that are known to be valuable in protecting the public range, because of the water supplies on them. Only three desert water reserves of this type have thus far been created, because the energies of the board have been so largely absorbed by its regular work that it could give but little attention to this feature. The information available in the Survey, however, is gradually being assembled, and as a result the creation of other reserves will be recommended to the Secretary during the fiscal year 1912-13.

By direction of the Secretary of the Interior an attempt has been made, in cooperation with officials of the Forest Service, to devise regulations for water-power development under the act of February 15, 1901 (31 Stat., 790), which shall provide for uniform administration by the departments of the Interior and of Agriculture on the public lands and the national forests. A draft of proposed regulations prepared in conference with the Forest Service was informally transmitted to the office of the Secretary of the Interior.

In connection with its work under the Carey Act the Geological Survey has continued to render to the Secretary, through the Commissioner of the General Land Office, full and detailed reports on the water supply available, the duty of water, the control of lands, the feasibility of the structures involved and of the project as a whole, and the protection afforded to the settlers under the contract with the State. It has urged that the investigation of these matters shall be much more thorough than in the past in order that the interests of settlers on Carey Act projects may be fully safeguarded.

To this end it has drafted and recommended to the Secretary for adoption detailed changes in the regulations governing the presentation by the States of applications for the segregation of lands under that act.

In the matter of internal organization and procedure there has been an endeavor to simplify and systematize the work of the Board, to the end that the available force might become more efficient and with a given expenditure of energy might produce a larger and more accurate output. Among the devices adopted for this purpose have been certain types of form letters, to be used in the simpler Land Office and Indian Office cases, and a series of "safety maps," prepared for each of the public-land States, to facilitate answers to inquiries as to mineral or power values. Two groups of these maps are in course of preparation—one by the division of mineral classification and the other by the division of hydrographic classification. On maps in the first group all areas known or suspected to contain mineral deposits of any type are colored in accordance with a definite plan. The remaining white areas may thereafter be automatically clear-listed as to mineral values. Similarly in the division of hydrographic classification maps have been prepared on which all areas known or suspected to contain reservoir sites or lands valuable for power development are appropriately colored. Thereafter the lands remaining white on these maps may be automatically clear-listed without special search of the records and the literature.

DIVISION OF MINERAL CLASSIFICATION.

The division of mineral classification receives from the geologic branch the results of the field work of its force and prepares from them the official classifications of mineral lands. Its work deals primarily with the classes of deposits whose reservation from entry is authorized by the withdrawal act (36 Stat., 847), namely, coal, oil and gas, and phosphate, but it also passes on the character of lands applied for under the nonmineral-land laws. An important special case of the latter type arising during the past year has been the classification of Northern Pacific Railroad grant lands under the act of February 26, 1895 (28 Stat., 683).

COAL.

The fiscal year 1911-12 has been notable, as regards the classification of coal lands, principally in that for the first time the lands classified and restored have much exceeded in area those withdrawn for classification, so that at the end of the year there was a substantial reduction in the area of land withdrawn. Heretofore, though the examinations have resulted in an increase in the area classified and restored each year and so have subtracted from the area with-

drawn, new information has led to the withdrawal of additional lands whose area has far exceeded that of the lands restored. Although no prediction on this point can be made with absolute certainty, it is probable that the area of withdrawn lands will continue to be decreased.

Classifications.—During the fiscal year 847,601 acres were classified as coal land and valued at \$14,751,472 and 13,794,262 acres were classified as noncoal land. A large part of the area classified as coal land was in the region of low-grade coals of North Dakota, South Dakota, and eastern Montana, where the appraised values under the regulations are the minimum fixed by law. Other large areas that are known to contain some coal have been withdrawn pending classification, and much of this land has been examined, classified, and restored to entry. Examination of some of these areas has revealed considerable land containing workable coal and work on other areas has shown that the workable coal is of small amount, so that much of the land withdrawn could be restored as noncoal as a result of relatively rapid work. On the other hand, the field work in areas containing thick and high-grade coals has been done with greater detail and care, covering smaller areas than in previous years, so that the total value of coal lands priced is not large as compared with the total value of lands priced in earlier years. No small part of the work has been the classification of lands in the Indian reservations that were to be thrown open to settlement. The following table shows the progress of coal-land classification by States during the year:

Coal land classified during the year ended June 30, 1912.

State.	Ont-stand- ing June 30.	Area classified as coal land and appraised (acres).		Area classified as non- coal land (acres).		Valuation fixed.		Minimum valuation.		Average price per acre.	
		Under old regulations.	Under new regulations.	Under old regulations.	Under new regulations.	Under old regulations.	Under new regulations.	Under old regulations.	Under new regulations.	Old reg- ulations.	New reg- ulations.
Arizona.....	1911			42,492							
	1912			42,492							
Arkansas.....	1911	60,715		70,088		81,473,792		\$1,214,280		\$24.30	
	1912	60,715		70,088		1,473,792		1,214,280		24.30	
California.....	1911	7,720		6,243							
	1912	7,720		6,243		855,086		855,086		\$154.40	\$75.80
Colorado.....	1911	2,873,929	882,987	4,856,539		167,771,04		50,309,589		58.40	
	1912	2,880,215	882,987	4,856,539		168,374,000		50,435,309		58.50	
Idaho.....	1911			6,710,572							
	1912			6,710,572							
Montana.....	1911	201,743	3,310,605	8,480,322		8,075,283		3,000,432		73,397,947	27.60
	1912	198,983	3,973,132	8,480,322		2,955,833		2,942,833		83,564,170	25.80
New Mexico.....	1911	363,767	590,447	2,005,217		6,714,128		6,702,083		8,821,729	24.60
	1912	363,767	590,285	2,005,217		6,714,128		6,702,083		8,818,289	24.70
North Dakota.....	1911	230,814		1,020,999		4,584,265		4,584,265		19.80	
	1912	230,814		1,020,999		4,584,265		4,584,265		19.80	
Oregon.....	1911		1,897	963,318						37,919	26.30
	1912		1,897	963,318						37,919	26.30
South Dakota.....	1911		82,217	6,517,628							
	1912		82,217	6,517,628		831,270		831,270		10.10	
Utah.....	1911	636,479	712,675	1,212,838		36,576,849		8,297,783		57.50	
	1912	670,308	602,771	1,719,130		38,323,592		8,678,513		57.30	
Washington.....	1911	40	627,238	32,036						800	50.00
	1912	40	627,238	32,036		2,000				800	50.00
Wyoming.....	1911	1,273,798	5,873,921	1,790,217		21,899,546		20,060,162		89,833,555	61.20
	1912	1,271,638	5,907,836	1,983,493		8,822,628		20,044,162		90,387,983	61.10
	1911	2,130,837	13,295,038	10,500,882		37,746,959		33,581,193		228,863,726	50.50
	1912	2,125,797	14,113,648	10,304,204		37,466,985		33,487,593		240,908,657	48.50
Total areas recorded as classified.....				42,577,119		688,381,667		6-93,800		12,044,931	55.80
		6-5,040	818,610	13,794,262		14,751,472					18.10

* Reductions during the year from former classification under old regulations, comprising lands either withdrawn or reclassified under new regulations.

The sale of coal lands at the new figures has continued at a moderate rate during the last year as during the years immediately preceding. In all, 7,951.05 acres were sold, for \$402,521.78, an average price of \$50.62 an acre. These sales indicate that the suggestion once made that coal lands would not sell at the new figures was not well founded. Indeed, with the increasing detail with which the work in the field is being done there is a growing tendency to accept the Survey's appraisal as a fair indication of the value of the lands classified by it. The increase in the coal production of the Rocky Mountain States during the last few years indicates that the coal industry of that region has not been injured, as it was feared by some it might be. Further, a comparison of the sales of coal land for the five years preceding and following the adoption of the classification policy shows a gain in the receipts from the sale of coal lands, with a slight decrease in the acreage sold. The following table shows the relations of the sales for the two five-year periods immediately preceding and following July 1, 1907:

Sales of coal land at all prices in the United States, exclusive of Alaska, from 1902 to 1911.

Five years prior to July 1, 1907.

Fiscal year.	Entries.	Acres.	Receipts.	Average price per acre.
1902-3.....	252	33,007.88	\$498,997.00	\$13.13
1903-4.....	190	28,827.42	395,200.90	13.74
1904-5.....	158	20,456.35	277,402.40	13.56
1905-6.....	244	42,143.39	538,683.70	12.54
1906-7.....	157	20,387.02	303,255.60	14.80
	1,001	149,822.06	2,013,548.60	13.44

Five years since July 1, 1907.

1907-8.....	299	58,047.10	\$647,584.55	\$11.15
1908-9.....	182	26,590.68	502,743.65	18.90
1909-10.....	189	26,074.16	657,175.30	25.20
1910-11.....	83	15,284.89	251,328.03	16.44
1911-12.....	76	7,951.05	402,521.78	50.62
	829	133,947.88	2,461,348.81	18.30

Under the regulations now in force a large share of the coal land will continue to be classified at the minimum price. Practically all the land in the Dakotas is being so priced, and much of that in Montana, besides a considerable percentage of the land classified in other States, so that purchases will continue to be made mainly at the minimum prices. As indicating that the higher-priced coal lands also sell, notwithstanding the higher prices, the following table is given, showing the prices at which coal lands have been sold, the num-

ber of entries at the different prices, the acres sold at those prices, and the receipts:

Sales of coal lands at various rates since July 1, 1907.

Price per acre.	Entries to date.	Acres.	Receipts.	Price per acre.	Entries to date.	Acres.	Receipts.
\$10.00	352	50,067.25	\$501,553.13	\$100.00	1	38.48	3,848.00
12.50	1	56.03	700.38	120.00	1	40	4,800.00
14.50	1	40	580.00	130.00	1	38.54	5,010.20
15.00	16	2,470.55	37,068.25	135.00	1	80	10,800.00
17.50	1	40	700.00	140.00	1	120	16,800.00
20.00	276	54,655.65	809,481.20	145.00	1	40	5,800.00
25.00	41	11,691.68	144,671.70	155.00	1	40	6,200.00
30.00	25	3,239.81	97,194.30	170.00	1	39.89	6,781.30
33.00	1	40	1,320.00	180.00	1	40	7,200.00
35.00	2	239.78	8,392.30	270.00	1	39.79	10,743.30
36.00	1	40	1,440.00	370.00	1	41.40	15,318.00
40.00	9	840.72	33,628.80	375.00	1	41.73	15,648.75
45.00	1	280	12,600.00	385.00	2	83.14	32,008.90
49.00	1	40	1,960.00	390.00	1	41.64	16,239.60
50.00	70	8,338.63	415,023.00	395.00	2	124.63	49,228.85
65.00	-----	200	13,000.00	400.00	2	83.15	33,260.00
70.00	1	40.79	2,855.30	405.00	3	166.51	67,426.55
75.00	2	161.23	12,092.25	410.00	2	83.39	34,189.90
90.00	2	204.96	18,446.40				
92.00	1	40	3,680.00		829	133,947.88	2,461,348.81
95.00	1	38.51	3,658.45				

Withdrawals and restorations.—As predicted in the report on this subject for 1911, the area of lands withdrawn during the fiscal year 1911-12 has been small as compared with that withdrawn during preceding years and for the first time has been less than the area classified and restored, so that at the end of the year there is a considerable net decrease in the area withdrawn over that withdrawn on June 30, 1911. Of the withdrawals made during 1911-12 that in Colorado, in the Denver Basin, involves only a relatively small amount of public land. The continued striking of workable coal in water wells in this area made it seem desirable to withdraw all the public land in the basin.

Coal lands withdrawn during the fiscal year 1911-12.

State.	Outstanding July 1, 1911.	New withdrawals during fiscal year.	Restorations during fiscal year.	Outstanding June 30, 1912.
	Acres.	Acres.	Acres.	Acres.
Arizona.....	118,718	.....	.....	118,718
California.....	239,903	.....	.....	239,903
Colorado.....	5,517,338	3,004,889	277,164	8,245,063
Idaho.....	6,965,417	11,520	5,430,019	1,566,918
Montana.....	19,890,471	20,189	2,268,369	17,642,291
Nevada.....	92,141	.....	.....	92,141
New Mexico.....	5,809,490	.....	59,060	5,750,440
North Dakota.....	18,454,490	.....	80	18,454,410
Oregon.....	3,521	.....	.....	3,521
South Dakota.....	2,375,263	.....	1,508,464	866,809
Utah.....	6,221,314	654,834	511,365	6,364,783
Washington.....	2,210,807	41,745	46,362	2,206,190
Wyoming.....	7,013,543	19,716	368,967	6,654,302
	74,932,416	3,752,893	10,469,820	68,215,489

Application for classification.—Increased understanding of the operation and effect of the act of June 22, 1910, is resulting in a decrease in the number of applications for the classification of lands included in coal withdrawals. A few entrymen, however, because entries under that act can not be commuted or because of other requirements or restrictions, object to patents reserving coal to the United States and therefore file applications to have lands classified as noncoal. Most of the affidavits by which such applications are supported are valueless, and therefore few such requests can be granted, since the withdrawals are made for the purpose of retaining title to the coal in the Government until information adequate for classification is obtained. The following table shows the action taken on cases of this class since the passage of the act under which they are made.

Applications for classification of withdrawn coal lands.

Year.	Received.	Approved.	Denied.	Pending.
1910-11.....	46	4	36	6
1911-12.....	18	1	22	1
	64	5	58	1

Applications for reclassification.—In order to guard against possible errors in classification, whereby injustice might be done, provision is made for applications for reclassification. Any person desiring to enter or select, under the agricultural laws, lands classified as coal lands may submit an application for reclassification, supporting it by affidavits setting forth the evidence which seems to him to show that the existing classification is erroneous. As a rule, the affidavits thus submitted are of the most perfunctory sort and are barren of facts affecting the classification. Now and then, however, an application is accompanied by valuable information, to which most careful consideration is given, and when this information shows the previous classification to be in error a reclassification is made.

There is a notable decrease in these applications from year to year, also due, doubtless, to the fact that the act of June 22, 1910 (36 Stat., 583), provides for homestead and desert-land entries on coal lands with a reservation of the coal to the United States. During the fiscal year following the passage of the act (1910-11) the number of applications was only a little over one-third that of the preceding year. The number received during the year 1911-12 is only a little over one-half that received during 1910-11, showing that the entryman who looked upon a reservation of coal to the Government as a cloud on the title is coming to realize that a restricted patent with the safeguards provided by the act referred to is not in any sense clouded. That the passage of the act of April 30, 1912,

extending the provisions of the act of June 22, 1910, to State selections, soldiers' additional homesteads, and isolated tract sales will result in a still further decrease in the number of applications for reclassification is indicated by the fact that of the 26 applications received during the year 7 were made in a single State. The following table shows the action on these applications since they first began to be received:

Applications for reclassification of coal lands.

Year.	Received.	Ap- proved.	Part approved.	Denied.	Pending.
1909-10.....	126	3	3	116	4
1910-11.....	48	0	0	21	a 29
1911-12.....	29	0	0	53	b 4
	203	3	3	190	4

a One case canceled by relinquishment and one returned to entryman.

b One case recalled by General Land Office.

OIL.

No legislation providing for the disposition of oil and gas in the public domain has been enacted during the year, and these minerals must be acquired, if at all, under the wholly unsatisfactory placer law, which adequately protects neither the Government nor the oil operator. In order to retain in public ownership all lands that are probably oil-bearing, pending the passage of a satisfactory oil and gas law, the withdrawn area has been increased during the year by 803,753 acres. A relatively small area in the West Side fields of California was withdrawn because of recent developments showing that the productive territory extends farther under the San Joaquin Valley than had at first been supposed. A withdrawal was made of over a million and a quarter acres in a little-known region in east-central Utah, which is indicated as a result of a preliminary examination by Survey geologists to be favorable for oil accumulation. Restorations were made of areas in California, New Mexico, and Wyoming, which were found not to be valuable for oil or gas. The following table shows the action during the year, by States:

Summary of withdrawals of oil lands, fiscal year 1911-12, in acres.

State.	Outstand- ing July 1, 1911.	New with- drawals.	Restora- tions.	Outstand- ing June 30, 1912.
Arizona.....	230,400			230,400
California.....	1,592,704	23,947	640	1,616,011
Colorado.....	87,474			87,474
Louisiana.....	414,720			414,720
New Mexico.....	419,901		419,901	0
Oregon.....	74,849			74,849
Utah.....	581,566	1,370,760		1,952,326
Wyoming.....	568,816		170,413	398,402
Total.....	3,970,429	1,394,707	590,954	4,774,182

PHOSPHATE.

The examination of phosphate deposits in the Rocky Mountain region was begun by the United States Geological Survey in 1909 and has been continued every year since that time. During the summer of 1911 deposits of phosphate rock similar in character to the deposits of eastern Idaho, and at the same geologic horizon, were discovered in west-central Montana, in the vicinity of Garrison, Elliston, and Philipsburg, by United States Geological Survey parties making examinations of Northern Pacific Railway lands. These discoveries proved that valuable phosphate beds extend much farther north and are distributed over a much wider territory than had formerly been supposed.

The phosphate discoveries made in examining the Northern Pacific lands, together with the phosphate examinations in eastern Idaho and western Wyoming, show that considerable areas now known to contain phosphate deposits were not included in the phosphate withdrawals. In order to protect these newly discovered phosphate beds and reserve them for future use pending the enactment of appropriate legislation for their disposition, all public lands containing valuable phosphate beds not included in existing phosphate reserves were withdrawn from entry. Any lands in a phosphate reserve that were examined and found to contain no phosphate deposits were restored to agricultural entry. Withdrawals and restorations have been made to cover all the phosphate lands examined in the summer of 1911, except those examined in western Wyoming, in the vicinity of the Gros Ventre Mountains. As soon as the data obtained in the examination are assembled the limits of the phosphate reserve in this region will be so modified as to include only lands shown by the examination to contain phosphate.

The year 1911-12 has been very productive as regards the examination of phosphate land. The area examined in detail and in a reconnaissance way, together with the area examined in connection with the Northern Pacific grant lands, greatly extended the knowledge of the western phosphate field. The field examinations this year, as in previous years, have materially increased the area withdrawn, so that at the end of the year the area covered by outstanding withdrawals is nearly a million acres more than a year ago. The field examinations each year have increased the area restored to agricultural entry and subtracted from the outstanding withdrawals all areas found to contain no phosphate. New information gathered each year has led to the withdrawal of additional lands not previously known to contain phosphate beds, and thus far the withdrawn lands far exceed the restored lands in area. As further field examinations are made the results will likely be reversed and the restoration will exceed the withdrawals as soon as most of the

phosphate land is included within the reserves, and thereafter field examinations will continue to cut down the area of the outstanding withdrawals.

Phosphate deposits must be acquired, if at all, under the present mining laws applicable to lode or placer claims, neither of which is satisfactory for the disposition of the stratified sedimentary phosphate beds. A number of measures, including a bill providing for "the acquiring of title to public lands classified as and carrying phosphate deposits," similar in tenor to the act of March 3, 1909, providing "for the protection of the surface rights of entrymen on coal land," were introduced during the second session of the Sixty-second Congress, but thus far none has become law.

During the year the regulations governing the withdrawals and restorations of phosphate lands have been so modified as to exclude from the phosphate reserves all deposits that do not contain phosphate in sufficient quantities to warrant holding them for this mineral. All sandstones, shales, and limestones containing less than 30 per cent of tricalcium phosphate are not considered phosphate deposits. Phosphate beds that are 6 feet or more thick and that contain 70 per cent or more of tricalcium phosphate are reserved to a depth of 5,000 feet; thinner and low-grade phosphate beds are held to depths ranging from the maximum of 5,000 feet to a minimum of zero at the surface.

The area withdrawn as a result of the examinations made in Montana comprises 240,911 acres. Detailed and reconnaissance examinations made in Idaho resulted in withdrawing 354,717 acres of phosphate land and restoring 349,049 acres to agricultural entry. As a result of the Survey's reconnaissance examinations in Wyoming, 826 acres were restored to entry and 597,591 acres were withdrawn pending detailed examination. In Florida 2,199 acres were restored to entry. A summary of the outstanding withdrawals follows.

Withdrawals of phosphate lands, fiscal year 1911-12, in acres.

State.	Outstanding July 1, 1911.	New withdrawals.	Restorations.	Outstanding June 30, 1912.
Florida.....	37,839		2,199	35,640
Idaho.....	952,388	354,717	249,049	1,058,056
Montana.....	33,950	240,911		274,861
Utah.....	107,745			107,745
Wyoming.....	1,267,494	597,591	826	1,864,259
	2,399,416	1,193,219	252,074	3,340,561

METALLIFEROUS DEPOSITS.

Under the act of February 26, 1895 (28 Stat., 683), provision was made for classifying, with regard to their mineral or nonmineral character, the lands within the Northern Pacific Railroad grant in

Montana and Idaho. The classification proved unsatisfactory for many areas and a reclassification was provided for in the sundry civil act of June 25, 1910 (36 Stat., 703). At the request of the General Land Office the reclassification was made by the Survey. The field examination of these lands was undertaken by the Survey during the field season of 1910, when 176,031 acres were classified as mineral and 112,434 acres as nonmineral. During the summer of 1911 three parties continued examinations of the Northern Pacific grant lands and succeeded in examining all the remaining tracts except a small number of parcels in Tps. 44 and 45 N., R. 9 E., and a few scattered tracts not listed to the Survey until after the close of the field season. A few of the Northern Pacific tracts not listed by the General Land Office until after the close of the field season were examined in the course of the work, as they lay adjacent to some of the lands investigated. The results of the classification work for the two years are shown in the following table:

Lands in Northern Pacific Railroad grant in Montana and Idaho classified by United States Geological Survey.

[Areas in acres.]

	Classified prior to July 1, 1911.	Classified during fiscal year 1911-12.	Classified June 30, 1912.
Mineral.....	176,031	20,278	196,309
Nonmineral.....	112,514	137,036	249,550
	288,545	157,314	445,859

Examinations of lands within the Blackfeet and Flathead Indian reservations, Mont., have also been made for the Indian Office by the Survey, in order to separate mineral from nonmineral lands as a basis for sales and allotments.

DIVISION OF HYDROGRAPHIC CLASSIFICATION.

The division of hydrographic classification considers reports on field examinations involving water supply and water utilization on the public lands and prepares classifications and correspondence based thereon. The scope and the amount of this work are fully set forth in the following paragraphs.

WATER POWER.

Withdrawals and restorations.—The classification of the public lands with relation to their value in connection with water power was continued during the year, the withdrawals being made under the authority conferred by an act of June 25, 1910 (36 Stat., 847), and sections 13 and 14 of another act of June 25, 1910 (36 Stat., 858, 859). On July 1, 1911, the area included in outstanding withdrawals was 1,515,423 acres. During the year, as a result of additional informa-

tion largely secured through field investigations by the topographic and water-resources branches, 353,444 acres additional were withdrawn and 55,114 acres previously included in power-site reserves were determined to be without sufficient value to warrant the continuance of the withdrawal and were restored to the public domain. The total area withdrawn in connection with water powers on June 30, 1912, was 1,813,753 acres.

The following table shows the action taken during the last year and the areas outstanding, classified by States:

Power-site reserves, fiscal year 1911-12.

State.	Outstanding July 1, 1911.	New with- drawals dur- ing fiscal year.	Restorations during fiscal year.	Outstanding June 30, 1912.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	213,390	3,019	23,448	192,961
California.....	53,689	115,383	4,064	165,008
Colorado.....	209,174	39,278	3,799	244,653
Idaho.....	229,692	72,432	6,667	296,457
Minnesota.....	8,368	2,866	.....	11,234
Montana.....	127,687	31,097	7,678	161,106
Nevada.....	15,375	.....	80	15,295
New Mexico.....	9,706	4,830	.....	14,536
Oregon.....	161,795	24,367	1,919	184,243
Utah.....	347,252	27,778	.....	375,030
Washington.....	80,366	29,734	6,979	103,141
Wyoming.....	58,889	2,660	480	61,069
	1,515,423	353,444	55,114	1,813,753

Applications for reclassification.—Thirty-two applications for the reclassification of lands included in power-site reserves have been filed by persons desirous of acquiring title to public lands so withdrawn. In 13 cases the lands desired were released from withdrawal because the lands were shown on investigation not to be valuable for power purposes. Fifteen applications were refused because of the power value of the lands requested.

Right-of-way applications.—The water-power possibilities involved or affected by applications for rights of way for railroads, irrigation canals and reservoirs, and water-power developments have been, as heretofore, reported upon by the Geological Survey.

During the fiscal year 600 applications were received and 798 were reported upon, so that 128 applications were pending report at the close of the year, as compared with 326 at the close of the preceding fiscal year. The character of the applications received and the action taken thereon are shown in the following table:

Applications for rights of way.

	Railroad.	Irrigation.	Water- power.	Miscella- neous.	Total.
Pending July 1, 1911.....	110	183	22	11	326
Received July 1, 1911, to June 30, 1912.....	132	399	29	40	600
Acted on July 1, 1911, to June 30, 1912.....	198	512	44	44	798
Pending June 30, 1912.....	44	70	7	7	128

IRRIGATION.

Reservoir withdrawals.—In addition to withdrawals of lands which appear to be primarily valuable in connection with water-power development, a number of reservoir sites, principally valuable for irrigation storage, have been surveyed by the Geological Survey and the lands included therein withdrawn from entry under the two withdrawal acts.

The area included in such withdrawals at the close of this fiscal year is shown in the following table:

Reservoir-site withdrawals.

State.	Outstand- ing July 1, 1911.	New with- drawals during fiscal year.	Restora- tions dur- ing fiscal year.	Outstand- ing June 30, 1912.
Arizona.....		23,040		23,040
Montana.....		15,640		15,640
North Dakota.....	1,091	478		1,569
Oregon.....	16,884			16,884
South Dakota.....		8,542		8,542
Washington.....	18,553	13,000		31,553
	36,528	60,700		97,228

Carey Act segregations.—During the year 31 applications for the segregation of lands under the Carey Act have been considered by the board, including five applications pending at the beginning of the fiscal year and seven resubmitted cases on which report had previously been made. These lists were referred to the Survey for report on the water supply available, the general feasibility of the projects, and the mineral or nonmineral character of the lands. Eight of the lists were recommended for approval, and the remaining 22 were reported as having insufficient water supply or inadequate plans of irrigation. In only three cases were the conditions such that the rejection of the applications was recommended. In general, attention was called to the defects in the project as presented, and recommendations were made that the State be allowed to amend, by decrease of area to be irrigated, by increase of storage capacity, or by such other means as appeared to be necessary to make the development reasonably safe, not only to the developing company but also to the investors in the bonds and to the settlers on the land. One list was awaiting report at the end of the year.

Irrigation projects.—In addition to determining power possibilities affected, the board reports on right-of-way applications filed in connection with irrigation projects, stating the general character and feasibility of the project and the control of the lands irrigable thereunder in the interest of the project. The purpose of such investigations is to effect the proper utilization of the water resources of the public lands and to prevent the title to public lands becoming

clouded by easements which are sought for canals and reservoirs that are not feasible of construction or which are filed for purely speculative purposes.

ENLARGED HOMESTEADS.

The scope of the act of February 19, 1909 (35 Stat., 639), commonly known as the enlarged-homestead act, was broadened by the act of June 13, 1912 (Public, No. 191), by the extension of its general provisions to the States of North Dakota and California. Classification of lands in the other 10 States to which the acts apply has proceeded along the lines previously followed. The area designated has, however, been much smaller than in previous years, owing primarily to the fact that the great bulk of the nonirrigable lands had already been opened to entry. The problems arising in connection with the designations are becoming increasingly complex and the reaching of a proper decision as to the character of lands frequently requires exhaustive field examination.

Designations under the general provisions of the act rest primarily upon the determination of the fact that the lands are "not susceptible of successful irrigation at a reasonable cost from any known source of water supply," although the arability of the lands, climatic conditions, and forest cover are also taken into consideration. The information upon which recommendations are based is obtained through field investigations by engineers and geologists of the Geological Survey and, in part, from reports of special agents of the General Land Office. Both the surface and the underground water supply available are considered in making these determinations.

The nonresidence provisions, applicable to the States of Utah and Idaho, require additional investigation to determine whether or not the lands "have upon them such a sufficient supply of water suitable for domestic purposes as would make continuous residence upon the lands possible." In this work not only are the quantity and quality of surface waters investigated, but the possibility of obtaining water for domestic purposes from wells is also considered.

The work of the fiscal year is summarized in the following table:

Summary of enlarged-homestead designations.

State.	Outstanding July 1, 1911.	New designa- tions during fiscal year.	Cancellations during fiscal year.	Outstanding June 30, 1912.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Arizona.....	26,580,917	380,320	19,468	26,950,779
Colorado.....	20,354,509	11,027	.....	20,365,536
Idaho:				
Sections 1-5 only.....	5,336,838	91,731	3,941	5,424,628
Section 6.....	3,841	5,723	a 1,763	7,801
	5,340,679	97,454	5,704	5,432,429

a Cancellation of designation under sec. 6, approved Mar. 2, 1912; acreage transferred to secs. 1-5 only.

Summary of enlarged-homestead designations—Continued.

State.	Outstanding July 1, 1911.	New designa- tions during fiscal year.	Cancellations during fiscal year.	Outstanding June 30, 1912.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Montana.....	31,853,580	175,566	320	32,028,776
Nevada.....	49,512,960			49,512,960
New Mexico.....	16,306,678	136,977		16,443,655
Oregon.....	11,213,661	144,227		11,357,888
Utah:				
Sections 1-5 only.....	6,765,780	177,891		6,943,671
Section 6.....	1,374,947	16,380	* 180,727	1,201,600
	8,140,727	194,271		8,145,271
Washington.....	3,402,896			3,402,896
Wyoming.....	17,538,941	52,671	3,639	17,587,973
	190,254,495	1,201,513	218,848	191,237,160

* Cancellation of designation under sec. 6, approved Feb. 16, 1912; 189,478 acres transferred to secs. 1-5 only.

There has been a large increase in the number of petitions for designation referred to the land-classification board. Previous to July 1, 1911, a total of 594 petitions had been filed; during the present fiscal year 511 petitions were received. Owing to the fact that but a small force could be assigned to make the necessary field investigations, only 299 petitions were disposed of during the fiscal year. The geographic distribution of the petitions and the action taken are indicated in the following table:

Action on enlarged-homestead petitions during the fiscal year ended June 30, 1912.

State.	Out- standing July 1, 1911.	Received during the year.	Designations made.			Acted on during the year	Pending.
			All	Part.	Refused.		
Arizona.....	1	5	2	4	0	6	0
Colorado.....	5	10	1	1	1	3	12
Idaho.....	79	256	16	17	82	115	220
Montana.....	24	134	38	24	38	100	58
Nevada.....	0	0	0	0	0	0	0
New Mexico.....	11	32	16	10	12	38	5
Oregon.....	0	33	1	7	7	16	25
South Dakota.....	0	1	0	0	1	1	0
Utah.....	3	7	0	1	1	2	8
Washington.....	3	15	0	0	2	2	16
Wyoming.....	3	18	2	5	9	16	5
	179	511	77	60	153	299	349

WATER RESERVES.

The withdrawal from entry of lands on which are situated springs, streams, or other watering places, which are valuable because of their control of adjacent public range, was initiated during the year. Six public water reserves were created during the year in the States of Utah and Wyoming, involving 23,143 acres in Utah and 62,979 acres in Wyoming.

TOPOGRAPHIC BRANCH.**ORGANIZATION.**

The organization of the topographic branch remained the same as at the close of the last fiscal year, except for the termination of the duties of one inspector, and is as follows:

Chief geographer, R. B. Marshall.

Atlantic division, Frank Sutton, geographer in charge.

Central division, W. H. Herron, geographer in charge.

Rocky Mountain division, Sledge Tatum, geographer in charge.

Pacific division, T. G. Gerdine, geographer in charge.

Inspectors of topography, J. H. Renshaw, geographer, and W. M. Beaman, topographer.

On account of the increase in work in the Pacific division, due to increase in State cooperation in water-power investigations and in other features, a reorganization of that division has been made, to take effect July 1, 1912, as follows:

Northwestern division (Washington, Oregon, Idaho), T. G. Gerdine, geographer in charge.

Pacific division (California, Arizona, Utah, Nevada, Hawaii), George R. Davis, geographer in charge.

PERSONNEL.

The technical corps of the topographic branch was increased during the year by the appointment of 1 assistant topographer, 21 junior topographers, and 2 draftsmen. It was reduced 14 by transfers, resignations, and deaths. With these changes the technical force now includes 1 chief geographer, 10 geographers, 10 topographic engineers, 42 topographers, 43 assistant topographers, 55 junior topographers, and 11 draftsmen—a total of 172. In addition, 60 technical field assistants were employed during a whole or a part of the field season. One geographer, two topographers, and one assistant topographer are on leave without pay.

PUBLICATIONS.

The work of the topographic branch for the fiscal year is represented by 114 maps and 17 book publications, namely, Bulletins 458, 464, 466, 468, 469, 472, 473, 476, 477, 481, 482, 486, 487, 488, 489, 493, and 496, titles and brief summaries of which are given on pages 25-31; and a preliminary edition of 300 copies of the instructions relating to triangulation, traverse, levels, and the adjustment of instruments was issued. At the close of the year manuscripts for Bulletins 514, 515, and 518 (Results of spirit leveling in New York, Pennsylvania, and Ohio, respectively) were at the Government Printing Office; in addition, the manuscripts for eight bulletins have been assembled

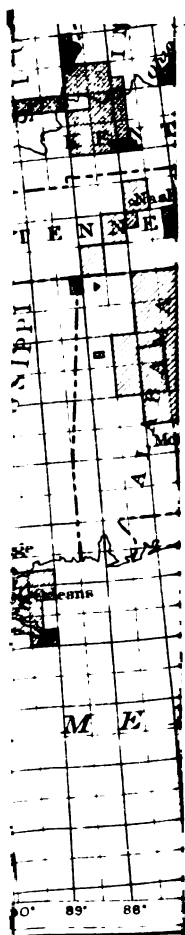
square miles—246 for publication on the scale of 1:62,500 and 14,460 for publication on the scale of 1:250,000.

Topographic surveys were also carried on in Hawaii, the area mapped during the fiscal year being 281 square miles, for publication on the scale of 1:31,680, making the total area in Hawaii surveyed to date 879 square miles. In connection with the surveys in Hawaii, 77 miles of primary and precise levels were run and 20 permanent bench marks established, making the total number of miles of primary and precise levels run by this survey in Hawaii 439.

Present condition of topographic surveys of the United States and new areas surveyed in 1911-12.

	New area surveyed in 1911-12.	Total area surveyed to June 30, 1912.	Percentage of total area of State surveyed to June 30, 1912.
	Square miles.	Square miles.	
Alabama.....	74	18,713	26
Arizona.....	25	64,461	57
Arkansas.....	337	21,380	40
California.....	3,965	103,311	65
Colorado.....	1,351	44,095	42
Connecticut.....		4,965	100
Delaware.....	194	1,202	51
District of Columbia.....		70	100
Florida.....	259	2,080	4
Georgia.....		17,337	20
Idaho.....	5,071	24,080	29
Illinois.....	1,017	12,110	21
Indiana.....		3,041	8
Iowa.....	290	11,086	19
Kansas.....		64,159	78
Kentucky.....	445	17,587	43
Louisiana.....	28	8,311	17
Maine.....	349	8,690	26
Maryland.....		12,327	100
Massachusetts.....		8,266	100
Michigan.....	268	5,385	9
Minnesota.....	837	5,188	6
Mississippi.....	55	1,889	4
Missouri.....	436	35,479	51
Montana.....	1,448	55,171	38
Nebraska.....	120	26,084	34
Nevada.....		50,675	46
New Hampshire.....		3,380	36
New Jersey.....		8,224	100
New Mexico.....	1,861	35,530	29
New York.....	686	41,605	84
North Carolina.....		17,661	34
North Dakota.....		9,716	14
Ohio.....	4,165	32,968	80
Oklahoma.....	524	39,215	55
Oregon.....	1,142	19,812	20
Pennsylvania.....	269	23,876	53
Rhode Island.....		1,248	100
South Carolina.....		5,640	18
South Dakota.....		18,594	24
Tennessee.....	118	20,911	50
Texas.....	580	67,387	25
Utah.....		67,905	79
Vermont.....	77	3,763	39
Virginia.....		29,980	70
Washington.....	1,025	22,619	32
West Virginia.....		24,170	100
Wisconsin.....		11,789	21
Wyoming.....	1,010	27,381	28
Hawaii.....	281	879	
	28,136	1,100,396	

* Includes 1,223 square miles of water area not reported during progress of field work.



GRAPHIC

ATLANTIC DIVISION.

FIELD WORK.

SUMMARY.

During the season topographic mapping was carried on in Alabama, Delaware, Florida, Georgia, Louisiana, Maine, Maryland, Mississippi, New Hampshire, New York, Pennsylvania, Tennessee, Vermont, Virginia, and West Virginia. This work comprised the survey of five quadrangles and the resurvey or revision of six quadrangles. In addition, 12 quadrangles were partly surveyed and 10 quadrangles were partly resurveyed or revised. The total new area mapped was 2,109 square miles—2,081 for publication on the scale of 1:62,500 and 28 for publication on the scale of 1:24,000. The area resurveyed was 1,392 square miles—1,329 for publication on the scale of 1:62,500, 43 for publication on the scale of 1:24,000, 19 for publication on the scale of 1:12,000, and 1 for publication on the scale of 1:9,600. In connection with this work 1,269 miles of primary levels were run and 327 permanent bench marks were established.

Primary triangulation and primary traverse were carried on at different times by four parties, the work being distributed over portions of Alabama, New York, North Carolina, Pennsylvania, South Carolina, Virginia, and West Virginia. The total area covered by this primary control was about 3,424 square miles, of which 3,198 square miles were controlled by primary traverse, 1,056 miles being run and 102 permanent marks set. Twenty-three triangulation stations were occupied and 17 were marked. The result of this work was to make control available in eighteen 15-minute quadrangles.

Topographic surveys in Atlantic division from July 1, 1911, to June 30, 1912.

State.	Contour interval.	For publication on scale of—						Total area surveyed.	Primary levels.		Primary traverse.	
		1:62,500.		1:24,000.		1:12,000; resurvey.			Distance run.	Bench marks.	Distance run.	Permanent marks.
		New.	Resurvey.	New.	Resurvey.							
	<i>Feet.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Mi.</i>		<i>Mi.</i>	
Alabama.....	20	74						74	138	22	611	55
Delaware.....	10	194						194	18	4		
Florida.....	10	259						259				
Georgia.....	50		235					235	47	15		
Louisiana.....	5			28				28				
Maine.....	20	349						349	57	15		
Maryland.....	20		129					129				
Mississippi.....	20	55						55				
New Hampshire.....	20				43	19	1	63	54	11		
New York.....	20	686						686	165	52	148	11
North Carolina.....	20							73	26	26	70	17
Pennsylvania.....	20	209						209	102	28	72	6
South Carolina.....	20								27	9	22	5
Tennessee.....	20-50	118	10					128			60	2
Vermont.....	20	77						77	51			
Virginia.....	20		86					36	316	89	72	6
West Virginia.....	50		919					919	216	56		
	.....	2,081	1,329	28	43	19	1	3,501	1,269	327	1,056	102

• 124 miles double primary levels.

DETAILS OF WORK BY STATES.

Alabama.—At the beginning of the fiscal year an agreement for the continuation of cooperative topographic surveys in Alabama was made between the State geologist and the United States Geological Survey, each to contribute \$10,000 toward the work. Owing to the fact that the State money has not yet been made available by the State legislature, all expenses of the work in Alabama during the fiscal year were paid from Federal funds, and the State will contribute its share toward the continuation of the work as soon as practicable. The survey of the Alabama portion of the Florence quadrangle, in Colbert and Lauderdale counties, was begun by W. H. S. Morey, T. F. Slaughter, R. A. Kiger, and Roscoe Reeves, the area mapped being 13 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of this area C. W. Arnold ran 62 miles of primary levels; and for the control of this and the Gravelly Springs, Rogersville, Tuscumbia, Russellville, Haleysville, Glen Allen, Guin, Fayette, Gordo, Samantha, and Tuscaloosa quadrangles, in Colbert, Lauderdale, Franklin, Lawrence, Winston, Marion, Fayette, Pickens, and Tuscaloosa counties, C. B. Kendall and F. W. Crisp ran 484 miles of primary traverse and set 45 permanent marks.

In addition to the cooperative work in Alabama, the Adger and Searles quadrangles, in Tuscaloosa and Jefferson counties, were controlled by F. W. Crisp and C. W. Arnold, 76 miles of primary levels being run, in connection with which 22 permanent bench marks were established, and 127 miles of primary traverse being run, in connection with which 10 permanent marks were set.

Delaware.—The survey of the Delaware portion of the Seaford quadrangle, in Sussex County, was completed by J. M. Whitman, R. L. Harrison, and J. H. Le Feaver, the area mapped being 194 square miles, for publication on the scale of 1:62,500, with a contour interval of 10 feet. For the control of this quadrangle Mr. Le Feaver ran 18 miles of primary levels and established 4 permanent bench marks.

Florida.—The survey of the Palatka quadrangle, in Putnam and St. John counties, was completed by W. H. Griffin and J. H. Le Feaver, the area mapped being 259 miles, for publication on the scale of 1:62,500, with a contour interval of 10 feet.

Georgia-Tennessee.—The resurvey of the Cohutta quadrangle (northeast quarter of the old Dalton 30-minute quadrangle), comprising 235 square miles in Murray, Fannin, and Gilmer counties, Ga., and 10 square miles in Polk County, Tenn., was completed by E. I. Ireland, C. W. Arnold, and Roscoe Reeves, for publication on the scale of 1:62,500, with a contour interval of 50 feet. For the control of this quadrangle Mr. Arnold ran 47 miles of primary levels and established 15 permanent bench marks.

Louisiana.—The survey of the Baxter Bayou and Delta Bridge $7\frac{1}{2}$ -minute quadrangles, in the Tensas Basin, was continued by W. N. Vance and Olinus Smith, the area mapped being 28 square miles in West Carroll and Tensas parishes, for publication on the scale of 1:24,000, with a contour interval of 5 feet.

Maine.—For the continuation of cooperative topographic surveys in Maine the State Survey Commission allotted \$4,700 and the United States Geological Survey \$4,500. The survey of the Bryant Pond quadrangle, comprising 214 square miles in Oxford County, was completed, and that of the Bethel quadrangle, in the same county, was begun, the area mapped being 135 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. This work was done by Hersey Munroe, R. A. Kiger, Olinus Smith, J. B. Metcalfe, and K. E. Schlachter. For the control of these quadrangles K. F. Maxcy ran 57 miles of primary levels and established 15 permanent bench marks.

Maryland.—For the continuation of cooperative topographic work in Maryland the State geologist and the United States Geological Survey each allotted \$1,825. The resurvey of the Maryland portions of the Nanjemoy (northeast quarter of the old Fredericksburg 30-minute quadrangle) and Indian Head (southeast quarter of the old Mount Vernon 30-minute quadrangle) 15-minute quadrangles, in Charles and Prince George counties, was completed by R. L. Harrison, the area resurveyed being 129 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. In addition to this work, Mr. Harrison revised the culture on the Brandywine and Prince Frederick 15-minute quadrangles, comprising the north half of the old Patuxent 30-minute quadrangle, and the Wicomico 15-minute quadrangle, comprising the northwest quarter of the old Nomini 30-minute quadrangle, all in Charles and Prince Georges counties.

Mississippi-Alabama-Tennessee.—The survey of the Iuka quadrangle, in Tishomingo County, Miss., Colbert and Lauderdale counties, Ala., and Hardin County, Tenn., was completed by J. F. McBeth and R. A. Kiger, the area mapped being 117 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. Of the area mapped, 55 square miles lies in Mississippi, 61 square miles in Alabama, and 1 square mile in Tennessee.

New Hampshire.—To meet the needs of the administration of the Weeks Act a special resurvey was made of an area covering 63 square miles in the White Mountains, Grafton County—1 square mile for publication on the scale of 1:9,600, with a contour interval of 20 feet; 19 square miles for publication on the scale of 1:12,000, with a contour interval of 20 feet; and 43 square miles for publication on the scale of 1:24,000, with a contour interval of 20 feet. This work was done by

Hersey Munroe, E. I. Ireland, W. H. S. Morey, Olinus Smith, R. A. Kiger, J. B. Metcalfe, J. H. Le Feaver, Roscoe Reeves, and E. E. Witherspoon. For the control of portions of this area, Messrs. Kiger, Witherspoon, and K. E. Schlachter ran 54 miles of primary levels and established 11 permanent bench marks. All expenses incurred in connection with this work were paid from the appropriations made in the Weeks Act.

New York.—The State engineer and surveyor of New York allotted \$10,000 for continuation of cooperative topographic surveys in the State, and the Federal Survey allotted a like sum for the same purpose. The survey of the Lowville, Dannemora, and Lyon Mountain quadrangles, in Lewis, Clinton, and Franklin counties, was completed by C. E. Cooke, J. M. Whitman, R. C. McKinney, J. I. Gayetty, W. H. S. Morey, Olinus Smith, J. B. Metcalfe, and J. H. Le Feaver, the area mapped being 553 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. The survey of the Number Four and Bonaparte quadrangles, in Herkimer, Lewis, Jefferson, and St. Lawrence counties, was begun by Messrs. Whitman, McKinney, Morey, Le Feaver, Roscoe Reeves, and E. E. Witherspoon, the area mapped being 133 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of the Lyon Mountain, Dannemora, and Number Four quadrangles and of the Ellenburg quadrangle, in Clinton County, R. A. Kiger, J. M. Perkins, and K. E. Schlachter ran 165 miles of primary levels and established 52 permanent bench marks. For the control of the Bonaparte quadrangle and of the Edwards and Gouverneur quadrangles, in Lewis, Jefferson, and St. Lawrence counties, C. B. Kendall ran 104 miles of primary traverse and set 7 permanent bench marks, and for the control of the Chateaugay quadrangle, in Franklin County, Mr. Kendall ran 44 miles of primary traverse and set 4 permanent marks. For the control of the Corning quadrangle, in Steuben County, G. T. Hawkins occupied 7 and marked 3 triangulation stations.

North Carolina-South Carolina.—For the control of the Gastonia quadrangle, in Gaston and Lincoln counties, N. C., and of the Pleasant Ridge quadrangle, in Gaston and Lincoln counties, N. C., and York County, S. C., F. W. Crisp and C. W. Arnold ran 105 miles of primary levels, establishing 35 permanent bench marks, and 93 miles of primary traverse, setting 22 permanent marks. Of this control, 27 miles of primary levels and 23 miles of primary traverse were run in the South Carolina portion of the Pleasant Ridge quadrangle, in connection with which 9 permanent bench marks and 5 permanent traverse marks were set.

Pennsylvania.—The Topographic and Geological Survey Commission of Pennsylvania allotted \$5,328.19 for the continuation of the

cooperative topographic survey of the State and the United States Geological Survey allotted a like sum. The survey of the Stoneboro and Mercer quadrangles, in Mercer, Crawford, Butler, and Lawrence counties, was completed by Robert Muldrow and R. C. McKinney, the area mapped being 269 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of the Mercer quadrangle Howard Mellinger ran 47 miles of primary levels and established 13 permanent bench marks. For the control of the Northeast quadrangle, in Erie County, K. W. Trimble ran 55 miles of primary levels and established 15 bench marks and G. T. Hawkins ran 72 miles of primary traverse and set 6 permanent marks, and for the control of the Stahlstown and Wind Gap quadrangles, in Westmoreland, Monroe, and Northampton counties, Mr. Hawkins occupied and marked 7 triangulation stations.

Tennessee.—The survey of the Hollow Springs quadrangle, in Coffee, Bedford, Cannon, and Rutherford counties, was completed by T. F. Slaughter, the area mapped being 117 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of the Murfreesboro quadrangle, in Rutherford County, Oscar Jones ran 60 miles of primary traverse and set 2 permanent marks. (See also pp. 108 and 109.)

Tennessee-North Carolina.—Revision of culture was completed by J. I. Gayetty over a portion of the Murphy quadrangle, in Polk and Monroe counties, Tenn., and Cherokee County, N. C.

Vermont.—The survey of the Woodstock quadrangle, in Windsor and Rutland counties, was completed by W. H. S. Morey and H. L. Dodge, the area mapped being 77 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of this quadrangle Mr. Dodge ran 51 miles of primary levels.

Virginia.—For the continuation of cooperative topographic surveys in Virginia in 1912 the State geologist allotted \$4,250, to be met with an equal amount by the Federal Geological Survey. As the State money was available for expenditure in June, field work was begun at that time, all expenses being borne by the State. For the control of the Pocahontas, Tazewell, Grundy, Bristol, Abington, Jonesville, Pound, Clintwood, and Estillville quadrangles, in Tazewell, Mercer, Russell, Lee, and Wise counties, L. F. Biggs and R. C. Seitz ran 233 miles of double primary levels and established 69 permanent bench marks.

In addition to the cooperative work in Virginia, the resurvey of the Fairfax quadrangle (the northwest quarter of the Mount Vernon 30-minute quadrangle), in Fairfax, Prince William, and Loudoun counties, was begun by Robert Muldrow and R. C. McKinney, the area resurveyed being 36 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of this

quadrangle E. E. Witherspoon ran 83 miles of primary levels and established 20 permanent bench marks and G. T. Hawkins ran 72 miles of primary traverse and set 6 permanent marks.

West Virginia.—For the continuation of cooperative topographic surveys in West Virginia the State geologist allotted \$12,000 and the United States Geological Survey allotted \$10,000. The resurvey of areas previously mapped resulted in the completion of the work on the Logan, Marshes, Flat Top, and Beckley (formerly called Red Star) quadrangles, the West Virginia portion of the Louisa quadrangle, and portions of the Crawford and Packs Ferry quadrangles, in Logan, Boone, Wyoming, Raleigh, Mercer, Summers, Fayette, Upshur, and Lewis counties. The total area mapped was 919 square miles, for publication on the scale of 1:62,500, with a contour interval of 50 feet, the work being done by E. I. Ireland, Fred McLaughlin, J. H. Le Feaver, C. W. Arnold, S. A. Judson, and Roscoe Reeves. For the control of these areas and of the Hinton and Meadow Creek quadrangles Mr. McLaughlin, L. F. Biggs, Mr. Arnold, and Mr. Witherspoon ran 216 miles of primary levels and established 56 permanent bench marks and C. B. Kendall occupied 9 triangulation stations and marked 7.

OFFICE WORK.

The drafting of the following sheets was completed: Searle, Ala.; Cohutta, Ga.; Bryant Pond and Buckfield, Maine; Brandywine and Wicomico, Md. (revision); Iuka, Miss.-Ala.-Tenn.; Dannemora, Lyon Mountain, and Lowville, N. Y.; Rochester, N. Y. (revision); Mercer and Stoneboro, Pa.; Hollow Springs, Tenn.; Woodstock, Vt.; Flat Top, Logan, Beckley, and Marshes, W. Va.

Progress in the drafting of additional sheets was made as follows: Palatka, Fla., 15 per cent; Delta Bridge, La., 80 per cent; Baxter Bayou, La., 25 per cent; Indian Head, Md.-Va. (resurvey), 43 per cent; Nanjemoy, Md.-Va. (resurvey), 43 per cent; Bethel, Maine, 20 per cent; Murphy, N. C.-Tenn. (revision), 23 per cent; Louisa, W. Va., 33 per cent.

In the computing section the following computations and adjustments were made:

Primary-level circuits were adjusted and geographic positions were computed for the Tuscumbia (Ala.) and Florence (Ala.-Tenn.) quadrangles. Primary-level circuits in the Iuka quadrangle (Ala.-Miss.-Tenn.) were adjusted. Geographic positions were computed for the Barton, Chickasaw, Cottdale, Fayette, Glen Allen, Gordo, Guin, Haleysville, Mantua, Powers, Russellville, Samantha, and Tuscaloosa (Ala.) and Gravelly Springs and Rogersville (Ala.-Tenn.) quadrangles.

Geographic positions were computed for the Arredondo, Ates Creek, Citra, Dinner Island, Eureka, Green Cove Springs, Hague,

Hawthorn, Interlachen, Lawtey, Palatka, Starke, and Welaka quadrangles (Fla.).

Primary-level circuits in the Cohutta and Spring Place quadrangles (Ga.-Tenn.) were adjusted.

Primary-level circuits in the Bethel, Bryant Pond, and Norway quadrangles (Maine) were adjusted.

Primary-level circuits in the Indian Head and Nanjemoy quadrangles (Md.-Va.) were adjusted.

Primary-level circuits were adjusted in the Dannemora, Lowville, Lyon Mountain, and Number Four quadrangles (N. Y.). Geodetic distances and positions were computed in the Corning, Elmira, and Hammondsport quadrangles (N. Y.).

Computations of positions of international boundary monuments between New York and Canada along the north borders of the Chateaugay, Ellenburg, Malone, Moira, Mooers, and Rouses Point quadrangles (N. Y.) were made.

Primary-level circuits in the Mercer quadrangle (Pa.) were adjusted. Geodetic distances and positions were computed in the Mauch Chunk, Somerset, Stahlstown, Wilpen, Windber, and Wind-gap quadrangles (Pa.). Geographic positions were computed and primary-level circuits were adjusted for the Northeast quadrangle (Pa.-N. Y.).

Primary-level circuits were adjusted and geographic positions were computed for the Fairfax and Haymarket (Va.) and Washington (Va.-Md.-D. C.) quadrangles.

Primary-level circuits were adjusted and geodetic distances and positions were computed for the Beckley, Crawford, Flat Top, and Sandrun quadrangles (W. Va.). Primary-level circuits in the Logan and Marshes quadrangles (W. Va.) were adjusted. Geodetic distances and positions in the Meadow Creek and Packs Ferry quadrangles (W. Va.) were computed.

Level lists were revised and assembled, after all necessary computations had been made, and transmitted to the editor for publication as bulletins for Alabama (Bulletin 517), Florida (Bulletin 516), New York (Bulletin 514), Pennsylvania (Bulletin 515), and Tennessee (Bulletin 519).

CENTRAL DIVISION.

FIELD WORK.

SUMMARY.

During the season topographic mapping was carried on in Arkansas (extending over a small area in Oklahoma), Illinois, Iowa, Kentucky, Michigan, Minnesota, Missouri, and Ohio. This work comprised the survey of 12 quadrangles and the resurvey of 1

quadrangle, in addition to which 40 quadrangles and 2 river projects were partly surveyed, 3 quadrangles were partly resurveyed, and 1 quadrangle was partly revised. The total new area mapped was 7,815 square miles—357 for publication on the scale of 1:125,000, 7,408 for publication on the scale of 1:62,500, and 50 for publication on the scale of 1:24,000. The area resurveyed was 554 square miles, for publication on the scale of 1:62,500. In connection with this work 3,664 miles of primary levels were run and 957 permanent bench marks established.

Primary traverse was carried on at different times by five parties, the work being distributed over portions of Illinois, Iowa, Michigan, Minnesota, Missouri, and Wisconsin. The total area covered by this primary control was about 10,207 square miles, 2,359 linear miles of primary traverse being run and 228 permanent marks set. The result of this work was to make control available in 102 quadrangles and 1 river project.

Topographic surveys in central division from July 1, 1911, to June 30, 1912.

State.	Con- tour inter- val.	For publication on scale of—					Total area sur- veyed.	Primary levels.		Primary traverse.	
		1:125,000; new.	1:62,500.		1:24,000; new.	Dis- tance.		Bench marks.	Dis- tance.	Perma- nent marks.	
			New.	Resur- vey.							
	<i>Feet.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Miles.</i>		<i>Miles.</i>		
Arkansas.....	50	337				337					
Oklahoma.....	50	20				20					
Illinois.....	10-20		967	4	50	1,021	420	146	1,078	91	
Indiana.....							a 66	29			
Iowa.....	20		290			290	115	31	115	10	
Kentucky.....	20-50		445	444		889	252	54			
Michigan.....	20		268			268	b 371	94	304	40	
Minnesota.....	10-20		837			837	235	68	677	61	
Missouri.....	20		436	106		542	150	17	75	6	
Ohio.....	10-20		4,165			4,165	2,055	518			
Wisconsin.....									110	20	
	.....	357	7,408	554	50	8,369	3,664	957	2,359	228	

^a 66 miles precise levels.

^b 68 miles precise levels.

DETAILS OF WORK BY STATES.

Arkansas-Oklahoma.—The survey of the De Queen quadrangle, in Polk, Howard, and Sevier counties, Ark., and McCurtain County, Okla., was completed by H. H. Hodgeson, W. R. Schreiner, and L. H. Williams, the area mapped being 357 square miles, for publication on the scale of 1:125,000, with a contour interval of 50 feet. Of this area 20 square miles lies in Oklahoma.

Illinois.—The governor of Illinois allotted \$10,000 for the continuation of cooperative topographic surveys in Illinois, and the United States Geological Survey allotted a like sum. The governor

also made an additional allotment of \$3,750 for a survey of the overflowed lands within the State, which was met by an allotment of \$1,250 by the Federal Survey. The mapping of the Colchester quadrangle, in McDonough, Hancock, and Schuyler counties, was completed, the area mapped being 128 square miles, and that of the Illinois portion of the Renault quadrangle, in Randolph and Monroe counties, was also completed, the area mapped being 159 square miles. The survey of the Sumner quadrangle, comprising 233 square miles in Lawrence, Edwards, Richland, and Wabash counties; of the Lincoln quadrangle, comprising 228 square miles in Logan County; and of the Illinois portion of the Crystal City quadrangle, comprising 28 square miles in Monroe County, was completed. The survey of the Centralia quadrangle, in Marion, Clinton, Bond, and Washington counties, was begun, the area mapped being 191 square miles. The resurvey of the Ottawa quadrangle, in Lasalle County, was begun, the area mapped being 4 square miles. This work was all for publication on the scale of 1:62,500, with contour intervals of 10 and 20 feet, and was done by Frank Tweedy, C. W. Goodlove, L. L. Lee, F. W. Hughes, J. B. Leavitt, S. R. Truesdell, and W. S. Gehres. For the control of these areas and of the Macomb quadrangle, in McDonough and Schuyler counties, C. R. French and R. G. Clinite ran 240 miles of primary levels and established 83 permanent bench marks. For the control of the Centralia quadrangle and of the Vandalia, Ottawa, Streator, Alto Pass, Carbondale, Jonesboro, Du Quoin, Iuka, Richview, Mount Vernon, Ina, and Pinkneyville quadrangles, in Marion, Jefferson, Washington, Franklin, Perry, Clinton, Fayette, Lasalle, Jackson, and Union counties, J. R. Ellis and P. W. McMillen ran 278 miles of primary traverse and set 23 permanent marks. For the control of the Forreston, Oregon, Freeport, Lena, Mount Carroll, Amboy, Pecatonica, Dixon, Rochelle, Walnut, Woosung, Jacksonville, Pearl, Jerseyville, Rushville, Winchester, Macomb, Vermont, Roodhouse, Edwardsville, Carlinville, Brighton, Harvel, Hettick, Litchfield, Staunton, Mulberry Grove, New Douglas, and Coffeen quadrangles, in Stephenson, Ogle, Carroll, Jo Daviess, Winnebago, Lee, Bureau, Whiteside, Morgan, Greene, Jersey, Schuyler, Scott, McDonough, Fulton, Macoupin, Montgomery, Christian, Bond, and Madison counties, J. H. Wilson ran 636 miles of primary traverse and set 54 permanent marks.

Under the allotment for overflowed lands L. L. Lee and J. B. Leavitt completed the survey of the Spoon River project, in Fulton County, the area mapped being 26 square miles. The survey of the Embarrass River project, in Jasper and Cumberland counties, was completed by Messrs. Lee and Leavitt and H. W. Peabody, the area mapped being 24 square miles. This work was for publication on the scale of 1:24,000, with a contour interval of 5 feet. For the con-

trol of the Spoon River project Mr. Leavitt ran 33 miles of primary levels and established 10 permanent bench marks. For the control of the Embarrass River project R. G. Clinite ran 27 miles of primary levels and established 18 permanent bench marks. For the control of the Saline River project, in Saline, Gallatin, Williamson, and Hardin counties, Mr. Clinite ran 120 miles of primary levels and established 35 permanent bench marks and J. R. Ellis ran 164 miles of primary traverse and set 14 permanent marks.

Indiana.—For the control of the Paoli, New Albany, New Salisbury, and Salem quadrangles, in Lawrence, Washington, Orange, Clark, Floyd, and Harrison counties, E. L. McNair ran 66 miles of precise levels and established 29 permanent bench marks.

Iowa.—The State geologist of Iowa allotted \$1,750 for the continuation of cooperative topographic surveys in Iowa, and the Federal Survey allotted an equal amount. In the spring of 1912 an additional sum of \$600 was made available by the State geologist for field work on the Boone and Story City quadrangles. The survey of the Madrid quadrangle, comprising 223 square miles in Boone and Dallas counties, and of the unmapped portion of the Slater quadrangle, covering 67 square miles in Polk and Story counties, was completed by W. L. Miller, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of the Madrid quadrangle Howard Clark ran 36 miles of primary levels and established 10 permanent bench marks.

For the control of the Boone and Story City quadrangles, in Story, Boone, Hamilton, and Webster counties, S. R. Archer ran 79 miles of primary levels and established 21 permanent bench marks, and for the control of these areas and of the Ogden and Nevada quadrangles, in Greene, Boone, Webster, Story, and Hamilton counties, J. R. Ellis ran 115 miles of primary traverse and set 110 permanent bench marks.

Kentucky.—The Kentucky Geological Survey allotted \$10,000 for the continuation of cooperative topographic surveys in that State, and the Federal Survey allotted a like sum. The survey of the Dunmor quadrangle, comprising 238 square miles in Ohio, Logan, Butler, and Muhlenberg counties, and of the unmapped portion of the Drakesboro quadrangle, covering 36 square miles in the same counties, was completed, and the survey of the Little Muddy quadrangle, in Butler, Warren, and Logan counties, was begun, the area mapped being 171 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. This work was done by C. W. Goodlove, W. A. Reiter, N. E. Ballmer, and C. W. Wardle. The resurvey of the Buckhorn (formerly called Crockettville) and Troublesome quadrangles, comprising the north half of the old Hazard 30-minute quadrangle, in Breathitt, Perry, Leslie, and Knott counties, was completed by J. R. Eakin, J. B. Leavitt, L. B.

Roberts, S. R. Archer, Edward Hyatt, jr., I. B. Gilbert, Stanley Hargen, and W. H. Phelps, the area resurveyed being 444 square miles, for publication on the scale of 1:62,500, with a contour interval of 50 feet. For the control of the Dunmor, Drakesboro, and Little Muddy quadrangles C. W. Wardle and E. C. Bibbee ran 178 miles of primary levels and established 40 permanent bench marks. For the control of the Troublesome quadrangle Mr. Archer ran 74 miles of primary levels and established 14 permanent bench marks.

Michigan.—For the continuation of cooperative topographic surveys in Michigan the State geologist allotted \$2,000, which was met with a like sum by the United States Geological Survey. The mapping of the Michigan portions of the Pioneer, Alvordton, Wauseon, and Swanton quadrangles, covering 144 square miles in Lenawee, Amboy, Hillsdale, and Monroe counties, was completed, for publication on the scale of 1:62,500, with a contour interval of 10 feet, the work being done by J. H. Jennings, W. N. Vance, Fred Graff, jr., H. W. Peabody, N. E. Ballmer, and W. H. Rayner. The Ohio portions of these quadrangles were surveyed in cooperation with the State of Ohio, as reported on pages 119–120. For the control of these areas and of the Hudson quadrangle, in Hillsdale and Lenawee counties, Howard Clark, C. R. French, A. D. Duck, F. J. Mabrey, Philip Flitman, and C. W. Howell ran 63 miles of primary levels and established 20 permanent bench marks. For the control of the Grand Rapids, Hastings, Lowell, Muir, Ionia, Vermontville, Jenison, and Holland quadrangles, in Kent, Ionia, Clinton, Eaton, Barry, Ottawa, and Allegan counties, L. D. Townsend ran 186 miles of primary levels and established 45 permanent bench marks. For the control of the Springport, Marshall, Homer, Spring Arbor, Hillsdale, and Reading quadrangles, in Jackson, Calhoun, Eaton, Ingham, and Hillsdale counties, J. R. Ellis ran 50 miles of primary traverse and set 5 permanent marks.

In addition to the cooperative work in Michigan the survey of the Houghton quadrangle, in Houghton County, was continued by A. M. Walker, L. D. Townsend, and Howard Clark, the area mapped being 124 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of the Houghton quadrangle Mr. Clark ran 54 miles of primary levels and established 10 permanent bench marks, and for the control of this area and of the Beacon Hill, Winona, Greenland, Paynesville, Rubicon, and Sidnaw quadrangles, in Houghton, Ontonagon, and Baraga counties, E. L. McNair ran 68 miles of precise levels and established 19 permanent bench marks.

Michigan-Wisconsin.—For the control of the Watersmeet, Kenton, Star Lake, State Line, Beechwood, Iron River, Sagola, Norway, Iron Mountain, Commonwealth, Three Lakes, Monico, Elcho, Antigo,

Hermansville, Bark River, and Escanaba quadrangles, in Ontonagon, Houghton, Gogebic, Iron, Dickinson, Delta, and Menominee counties, Mich., and Forest, Florence, Oneida, Vilas, and Langlade counties, Wis., E. L. McNair ran 364 miles of primary traverse and set 55 permanent marks, of which 110 miles were run and 20 marks set in Wisconsin and 254 miles were run and 35 permanent marks set in Michigan.

Minnesota.—The State drainage engineer of Minnesota allotted \$10,000 for the continuation of cooperative topographic work in that State and the United States Geological Survey made an equal allotment. The survey of the unmapped portions of the Underwood quadrangle, covering 192 square miles in Ottertail County; of the Fergus Falls quadrangle, covering 169 square miles in Ottertail County; and of the Ashby quadrangle, covering 87 square miles in Douglas, Grant, and Ottertail counties, was completed. The survey of the Battle Lake quadrangle, in Ottertail County, was begun, the area mapped being 181 square miles; that of the Perham quadrangle, in Ottertail and Becker counties, was begun, the area mapped being 196 square miles; and that of the Dora quadrangle, in Ottertail and Becker counties, was begun, the area mapped being 12 square miles. These areas were mapped for publication on the scale of 1:62,500, with contour intervals of 10 and 20 feet, and the work was done by C. L. Sadler, F. B. Barrett, O. H. Nelson, L. B. Roberts, and W. A. Reiter. For the control of the Perham quadrangle J. M. Ray ran 78 miles of primary levels and established 23 permanent bench marks and J. R. Ellis ran 42 miles of primary traverse and set 5 permanent marks. For the control of the Dora and Pelican Rapids quadrangles, in Ottertail and Becker counties, Mr. Ray ran 157 miles of primary levels and established 45 permanent bench marks; and for the control of these areas and of the Barnesville, Hawley, Lake Park, Flom, Faith, Ogema, Many Points, Detroit Lake, Senjen, Lonnrot, and New York Mills quadrangles, in Becker, Ottertail, Clay, Norman, Williams, and Clearwater counties, Mr. Ellis and P. W. McMillan ran 348 miles of primary traverse and set 34 permanent marks. For the control of the Cross Lake, Emily, Aitkin, McGregor, Seavey, Wealthwood, Deerwood, Brainerd, Rucker, Onamia, and Opstead quadrangles, in Cross Lake, Aitkin, Crow Wing, Mille Lacs, and Kanabec counties, E. L. McNair and A. D. Duck ran 287 miles of primary traverse and set 22 permanent marks.

Missouri.—For the continuation of cooperative topographic surveys in Missouri the State geologist allotted \$6,000 and the United States Geological Survey allotted an equal amount. The survey of the Green City quadrangle, comprising 228 square miles in Putnam, Adair, and Sullivan counties, and of the unmapped portion of the Queen City quadrangle, covering 208 square miles in Schuyler,

Adair, and Putnam counties, was completed by W. J. Lloyd, F. W. Hughes, W. S. S. Johnson, and W. S. Gehres, for publication on the scale of 1:62,500, with a contour interval of 20 feet. The resurvey of the Mecca quadrangle (the northeast quarter of the old Kansas City 30-minute quadrangle), in Clay, Clinton, and Platte counties, was begun by H. H. Hodgeson and J. B. Leavitt, the area mapped being 106 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of the Green City and Queen City quadrangles P. W. McMillan and James Rayburn ran 83 miles of primary levels and established 17 permanent bench marks. For the control of the Mecca quadrangle Mr. Leavitt and P. W. McMillan ran 67 miles of primary levels, and for the control of this area and of the Kansas City, Independence, and Gower quadrangles, in Platte, Clay, and Clinton counties, J. R. Ellis ran 75 miles of primary traverse and set 6 permanent marks.

Ohio.—The governor of Ohio allotted \$28,400 in addition to the unexpended balance of last year's fund, amounting to about \$3,000, for the continuation of the cooperative topographic survey of that State and the United States Geological Survey allotted \$15,000. The survey of the unmapped portions of the Jackson quadrangle, covering 87 square miles in Jackson, Vinton, and Ross counties; of the New Comerstown quadrangle, covering 154 square miles in Coshocton, Tuscarawas, and Holmes counties; of the Celina quadrangle, covering 51 square miles in Mercer and Van Wert counties; of the Van Wert quadrangle, covering 174 square miles in Paulding and Van Wert counties; of the Circleville quadrangle, covering 80 square miles in Pickaway, Ross, and Fairfield counties; of the Navarre quadrangle, covering 178 square miles in Starke, Holmes, Wayne, and Tuscarawas counties; of the Era quadrangle, covering 210 square miles in Pickaway, Ross, and Madison counties; and of the Sidney quadrangle, covering 168 square miles in Shelby, Logan, Champaign, and Auglaize counties, was completed. The survey of the Paulding quadrangle, covering 225 square miles in Paulding County; of the Bryan quadrangle, covering 224 square miles in Williams and Defiance counties; and of the Roxabel quadrangle, covering 231 square miles in Ross County, was completed. The survey of the Ohio portions of the Berne quadrangle, covering 48 square miles in Mercer and Van Wert counties; of the Bobo quadrangle, covering 48 square miles in Van Wert and Paulding counties; of the Halls Corners quadrangle, covering 48 square miles in Paulding County; of the Butler quadrangle, covering 48 square miles in Williams and Defiance counties; of the Edon quadrangle, covering 39 square miles in Williams County; of the Pioneer quadrangle, covering 179 square miles in Williams County; of the Alvordton quadrangle, covering 184 square miles in Williams and Fulton counties; of the Wauseon quadrangle, covering

190 square miles in Fulton County; and of the Swanton quadrangle, covering 197 square miles in Fulton and Lucas counties, was completed. The Michigan portions of the last four quadrangles were mapped in cooperation with that State, as reported on page 117. The survey of the following quadrangles was begun: Millersburg, in Holmes and Wayne counties, the area mapped being 86 square miles; Fredericktown, in Knox, Licking, and Morrow counties, 159 square miles; Cardington, in Morrow, Marion, and Delaware counties, 202 square miles; Perrysville, in Richland, Knox, and Ashland counties, 122 square miles; Shauck, in Richland, Knox, and Morrow counties, 65 square miles; Coshocton, in Coshocton and Holmes counties, 119 square miles; Gambier, in Knox County, 197 square miles; Siam, in Seneca and Huron counties, 118 square miles; Loudonville, in Ashland and Holmes counties, 92 square miles; Troy, in Shelby, Logan, Champaign, and Miami counties, 203 square miles; and Brinkhaven, in Coshocton, Knox, and Holmes counties, 39 square miles. The total area mapped in Ohio was 4,165 square miles, for publication on the scale of 1:62,500, with contour intervals of 10 and 20 feet. The work was done by J. H. Jennings, G. S. Smith, W. H. Griffin, Merrill Hackett, W. L. Miller, W. N. Vance, A. P. Meade, Fred Graff, jr., S. G. Lunde, J. A. Duck, A. J. Ogle, F. W. Hughes, H. W. Peabody, J. L. Lewis, O. G. Taylor, J. H. Wilson, W. S. S. Johnson, L. D. Townsend, N. E. Ballmer, Howard Clark, W. H. Rayner, L. B. Glasgow, L. H. Williams, and C. W. Howell.

A small area in the West Columbus quadrangle, in Franklin, Pickaway, and Fairfield counties, was revised by Mr. Duck.

For the control of the Celina quadrangle C. W. Howell ran 5 miles of primary levels. For the control of the Bryan quadrangle Mr. Howell, A. D. Duck, C. R. French, and C. E. Mills ran 101 miles of primary levels and established 27 permanent bench marks. For the control of the Sidney quadrangle E. C. Bibbee ran 7 miles of primary levels and established 2 permanent bench marks. For the control of the Paulding quadrangle Mr. Mills ran 69 miles of primary levels and established 18 permanent bench marks. For the control of the Swanton quadrangle F. J. Mabrey ran 77 miles of primary levels and established 18 permanent bench marks. For the control of the Fredericktown, Cardington, Perrysville, and Shauck quadrangles Mr. Bibbee, Philip Flitman, Mr. Mabrey, Mr. Howell, and Howard Clark ran 286 miles of primary levels and established 78 permanent bench marks. For the control of the Era quadrangle J. J. McNulta ran 72 miles of primary levels and established 21 permanent bench marks. For the control of the Butler quadrangle Mr. Clark and Mr. Howell ran 18 miles of primary levels and established 6 permanent bench marks. For the control of the Wauseon quadrangle Mr. Clark ran 98 miles of primary levels and established 25

permanent bench marks. For the control of the Roxabel quadrangle Mr. McNulta ran 127 miles of primary levels and established 25 permanent bench marks. For the control of the Edon quadrangle Mr. French ran 23 miles of primary levels and established 6 permanent bench marks. For the control of the Halls Corners quadrangle Mr. Duck ran 24 miles of primary levels and established 6 permanent bench marks. For the control of the Troy quadrangle Mr. McNulta and Mr. Bibbee ran 86 miles of primary levels and established 32 permanent bench marks. For the control of the Pioneer quadrangle Mr. Howell, Mr. Duck, and Mr. French ran 96 miles of primary levels and established 29 permanent bench marks. For the control of the Alvordton quadrangle Mr. Howell, Mr. Clark, and Mr. Flitman ran 73 miles of primary levels and established 17 permanent bench marks.

For the control of the Mount Gilead, Shiloh, Bellefontaine, Georgetown, St. Paris, Bucyrus, Brinkhaven, Siam, Norwalk, Gambier, Loudonville, Sandusky, and Waynesville quadrangles, in Morrow, Marion, Crawford, Richland, Huron, Champaign, Clark, Logan, Brown, Seneca, Coshocton, Holmes, Knox, Erie, Green, Montgomery, Sandusky, Wayne, and Ashland counties, Messrs. Flitman, Mills, Bibbee, McNulta, Archer, Clark, and Howell ran 893 miles of primary levels and established 208 permanent bench marks.

OFFICE WORK.

The drafting of the following sheets was completed: De Queen, Ark.-Okla.; Colchester, Lincoln, Sumner, Embarrass River drainage, and Spoon River drainage, Ill.; Galena, Ill.-Iowa; Madrid and Slater, Iowa; Troublesome, Dunmor, Buckhorn, Drakesboro, and Monticello, Ky.; Ashby and Fergus Falls, Minn.; Queen City, Mo.; Alvordton, Pioneer, Swanton, and Wauseon, Ohio-Mich.; Celina, Circleville, Era, Jackson, Bryan, Navarre, New Comerstown, Paulding, Sciotoville, Sidney, and Van Wert, Ohio.

Progress in the drafting of additional sheets was made as follows: Crystal City, Ill., 10 per cent; Renault, Ill., 80 per cent; Little Muddy, Ky., 52 per cent; Grand Rapids, Mich., 12 per cent; Houghton, Mich., 77 per cent; Battle Lake, Minn., 55 per cent; Underwood, Minn., 23 per cent; Berne, Ohio, 22 per cent; Bobo, Ohio, 22 per cent; Butler, Ohio, 22 per cent; Edon, Ohio, 18 per cent; Halls Corners, Ohio, 22 per cent; Roxabel, Ohio, 45 per cent; Troy, Ohio, 25 per cent.

In the computing section the following computations and adjustments were made:

Primary-level circuits were adjusted and geographic positions were computed for the Carbondale, Centralia, Equality, Marion, Odell, Ottawa, Stonefort, and Streator (Ill.), and Shawneetown (Ill.-Ky.)

quadrangles. Primary-level circuits were adjusted in the Avon, Canton, Galesburg, Hardinville, Moonshine, Newton, and Rosehill (Ill.), Birds and Vincennes (Ind.-Ill.), and Crystal City and Renault (Ill.-Mo.) quadrangles. Geographic positions were computed for the Amboy, Brighton, Carlinville, Coffeen, Dixon, DuQuoin, Edwardsville, Forreston, Freeport, Harvel, Hettick, Hoyleton, Iuka, Jacksonville, Lena, Litchfield, Macomb, Marseilles, Morrisonville, Mount Carroll, Mount Vernon, Mulberry Grove, Oregon, Pearl, Pecatonica, Pinckneyville, Richview, Rochelle, Roodhouse, Rushville, Sandwich, Staunton, Vandalia, Vermont, Walnut, and Winchester (Ill.) and Alto Pass, Hardin, and Jonesboro (Ill.-Mo.) quadrangles.

A precise-level circuit in the Paoli and Salem (Ind.) and New Albany (Ind.-Ky.) quadrangles was adjusted.

Primary-level circuits were adjusted in the Madrid, Slater, and Story City quadrangles (Iowa). Geographic positions were computed for the Boone, Nevada, Ogden, and Story City quadrangles (Iowa).

Primary-level circuits were adjusted in the Buckhorn, Creelsboro, Daysville, Drakesboro, Dunmor, Glenmore, Jabez, Lee City, Little Muddy, Monticello, Nortonville, Russellville, Salmons, and Troublesome quadrangles (Ky.).

Precise and primary level circuits were adjusted and geographic positions were computed for the Houghton quadrangle (Mich.). Precise level circuits were adjusted and geographic positions were computed for the Greenland, Paynesville, Rubicon, Sidnaw, and Winona quadrangles (Mich.). Primary-level circuits were adjusted and geographic positions were computed for the Adrian, Grand Rapids, Hudson, Ionia, Jenison, Lowell, and Muir quadrangles (Mich.). Primary-level circuits in the Holland (Mich.) and Edon (Ind.-Ohio-Mich.) quadrangles were adjusted. Geographic positions were computed for the Allegan, Bark River, Beacon Hill, Blissfield, Cedar Springs, Crystal Falls, Dundee, Escanaba, Hardwood, Hastings, Hermansville, Hillsdale, Homer, Kalamazoo, Kenton, Marshall, Norway, Sagola, Schoolcraft, Spring Arbor, Springport, Watersmeet, and Wayland (Mich.), Beechwood, Commonwealth, Iron River, Menominee special, and State Line (Mich.-Wis.), and Centerville and Reading (Mich.-Ind.) quadrangles.

Primary-level circuits were adjusted and geographic positions were computed for the Detroit Lake, Dora, Pelican Rapids, and Perham quadrangles (Minn.). Primary-level circuits in the Battle Lake and Underwood quadrangles (Minn.) were adjusted. Geographic positions were computed for the Aitkin, Barnesville, Brainerd, Deerwood, Emily, Flom, Hawley, Lake Park, Lonnrot, Many Points, New York Mills, Ogema, Senjen, Twin Valley, Ulen, and Wealthwood quadrangles (Minn.).

Primary-level circuits were adjusted in the Edna, Green City, and Queen City (Mo.) and Rulo (Mo.-Nebr.) quadrangles. Geographic positions were computed for the Independence, Mecca, and Plattsburg (Mo.) and Kansas City (Mo.-Kans.) quadrangles.

Primary-level circuits were adjusted and geographic positions were computed for the Bellefontaine, Brinkhaven, Bryan, Bucyrus, Cardington, Celina, Fredericktown, Gambier, Mount Gilead, Norwalk, Paulding, Perrysville, Plimpton, St. Paris, Shauck, Shiloh, Siam, and Van Wert (Ohio), Berne, Bobo, Butler, and Halls Corner (Ind.-Ohio), and Swanton (Ohio-Mich.) quadrangles. Primary-level circuits were adjusted in the Bainbridge, Chillicothe, Circleville, Era, Greenfield, Mount Sterling, Napoleon, Roxabel, Sandusky, Sardinia, Sidney, Troy, West Columbus, and Westerville (Ohio), Alvordton, Pioneer, and Wauseon (Ohio-Mich.), and Georgetown (Ohio-Ky.) quadrangles. Primary-traverse positions were computed for the Alger, Ashland, Continental, Defiance, Delaware, Delphos, East Liberty, Kenton, Larue, Mechanicsburg, Milford Center, New London, Richwood, South Charleston, Sycamore, and West Salem quadrangles (Ohio).

Geographic positions were computed for the Antigo, Brodhead, Browntown, Elcho, Monico, Monroe, Robbins, and Three Lakes (Wis.) and Star Lake (Wis.-Mich.) quadrangles.

Level lists were revised and assembled, after all necessary computations had been made, and transmitted to the editor for publication as bulletins for Illinois, Indiana, Kentucky, and Ohio. Primary traverse and triangulation lists for Ohio for 1898 to 1911, inclusive, were revised and assembled, after all necessary computations had been made, and transmitted for publication as a bulletin.

ROCKY MOUNTAIN DIVISION.

FIELD WORK.

SUMMARY.

During the season topographic mapping was carried on in Colorado, Montana, Nebraska, New Mexico, Oklahoma, Texas, and Wyoming. This work comprised the survey of 4 quadrangles and the resurvey of 1 quadrangle and 1 special area, in addition to which 20 quadrangles and 2 national parks were partly surveyed, 6 quadrangles were partly resurveyed, and 1 quadrangle was partly revised. The total new area mapped was 6,366 square miles—4,498 for publication on the scale of 1:125,000 and 1,868 for publication on the scale of 1:62,500. The area resurveyed was 2,312 square miles—1,899 for publication on the scale of 1:125,000, 218 for publication on the scale of 1:62,500, 180 for publication on the scale of 1:31,680, and 15 for publication on the scale of 1:9,600. In connection with this work,

1,251 miles of primary levels were run and 330 permanent bench marks were established. River-profile surveys were also made on two streams, the total distance traversed being 292 miles.

Primary triangulation was carried on at different times by one party, the work being distributed over portions of Colorado and New Mexico. The total area covered by this primary control was about 3,500 square miles, 27 triangulation stations being occupied and 21 marked. The result of this work was to make control available in 5 quadrangles and 1 special area.

Topographic surveys in Rocky Mountain division from July 1, 1911, to June 30, 1912.

State.	Con- tour inter- val.	For publication on scale of—						Total area sur- veyed.	Primary levels.	
		1:125,000.		1:62,500.		1:31,680.	1:9,600.		Dis- tance run.	Bench marks.
		New.	Resur- vey.	New.	Resur- vey.	Resur- vey.	Resur- vey.			
Colorado.....	25, 50, 100	<i>Sq. mi.</i> 770	<i>Sq. mi.</i> 880	<i>Sq. mi.</i> 581	<i>Sq. mi.</i>	<i>Sq. mi.</i>	<i>Sq. mi.</i> 15	<i>Sq. mi.</i> 2,246	<i>Miles.</i> 199	62
Montana.....	20, 100	653	.....	197	.....	180	.....	1,030	64	18
Nebraska.....	20	.....	.....	120	.....	.....	.....	120	117	35
New Mexico.....	50, 100	1,825	.....	126	.....	.....	.....	1,951	96	21
Oklahoma.....	50	504	1,019	.....	.....	.....	.....	1,523	573	141
Texas.....	25	.....	.....	580	.....	.....	.....	580	73	18
Wyoming.....	20, 25, 50	746	.....	264	218	.....	.....	1,228	139	35
		4,498	1,899	1,868	218	180	15	8,678	1,251	330

DETAILS OF WORK BY STATES.

Colorado.—The survey of the Mesa Verde National Park, in La Plata and Montezuma counties, was completed by R. W. Berry and C. A. Ecklund, the area mapped being 115 square miles, for publication on the scale of 1:62,500, with a contour interval of 50 feet. The survey of the Red Mesa quadrangle, comprising 238 square miles in La Plata County, was completed by Messrs. Berry and Ecklund, for publication on the scale of 1:62,500, with a contour interval of 50 feet. The survey of the unmapped portion of the Hahns Peak quadrangle, lying partly in the Park Range National Forest, Routt and Jackson counties, was completed by Gilbert Young and C. W. Rowell, the area mapped being 385 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet, and the survey of the Meeker quadrangle, comprising 228 square miles in Rio Blanco and Moffat counties, was completed by the same party for publication on the scale of 1:62,500, with a contour interval of 50 feet. The survey of the Chromo quadrangle (formerly called Price), lying partly in the San Juan and Rio Grande national forests, Archuleta County, was continued by S. T. Penick, the area mapped being 385

square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. The resurvey of the Leadville mining district (formerly mapped as the Leadville special area), comprising 15 square miles in Lake and Eagle counties, was completed by E. P. Davis and S. E. Taylor, for publication on the scale of 1:9,600, with a contour interval of 25 feet. The resurvey of the Castle Rock quadrangle, in El Paso, Elbert, and Douglas counties, was completed by C. G. Anderson and G. W. Lucas, the area mapped being 755 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet, and the resurvey of a portion of the Ignacio quadrangle, lying partly in the San Juan National Forest, La Plata County, was completed by Mr. Anderson, the area resurveyed being 125 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. For the control of the Mesa Verde National Park and of the Hahns Peak, Red Mesa, and Meeker quadrangles Mr. Rowell and R. M. Copeland ran 184 miles of primary levels and established 52 permanent bench marks. For the control of the Leadville mining district Mr. Taylor ran 15 miles of primary levels and established 10 permanent bench marks and R. B. Robertson occupied 9 triangulation stations and marked 8.

A profile survey of a section of Grand River, in Colorado and Utah, was made by R. C. Seitz, the distance traversed being 192 miles, of which 131 miles was in Mesa, Garfield, Grand, Eagle, and Routt counties, Colo., and 61 miles in Emory County, Utah.

Montana.—The survey of the unmapped portions of the Brockton quadrangle, covering 103 square miles in Dawson County, and of the Homestead quadrangle, covering 94 square miles in Valley County, was completed by J. H. Wilke and C. P. McKinley, for publication on the scale of 1:62,500, with a contour interval of 20 feet. The survey of the unmapped portion of the Marias Pass quadrangle (formerly called Midvale), lying partly in the Glacier National Park and in the Blackfeet, Flathead, and Lewis and Clark national forests, Teton and Flathead counties, was completed by R. T. Evans and F. L. Whaley, the area mapped being 433 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet; and the survey of the unmapped portion of the Nyack quadrangle, lying partly in the Glacier National Park and in the Blackfeet and Flathead national forests, Flathead County, was continued by Mr. Evans, W. J. Forster, Lee Morrison, and C. C. Holder, the area mapped being 220 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. The resurvey of several townships comprising portions of the Divide and Willis quadrangles (previously reported as the Melrose special), in Silver Bow, Beaverhead, and Madison counties, was continued by R. H. Reineck, the area mapped being 180 square miles, for pub-

lication on the scale of 1:31,680, with a contour interval of 50 feet. For the control of the Brockton and Homestead quadrangles Mr. McKinley ran 64 miles of primary levels and established 18 permanent bench marks.

The profile survey of Clark Fork, in Montana and Idaho, was continued by R. C. Seitz, the distance traversed being 100 miles, of which 87 miles was in Sanders County, Mont., and 13 miles in Bonner County, Idaho.

Nebraska.—The State geologist of Nebraska allotted \$1,500 for cooperative topographic surveys in that State and the United States Geological Survey allotted a like sum. The survey of the Nebraska portion of the Nemaha quadrangle, covering 94 square miles in Richardson and Nemaha counties, was completed by R. H. Reineck and C. C. Gardner, for publication on the scale of 1:62,500, with a contour interval of 20 feet. The survey of the Falls City quadrangle, in Richardson County, was begun by Mr. Gardner and R. R. Monbeck, the area mapped being 26 square miles, for publication on the scale of 1:62,500, with a contour interval of 20 feet. For the control of these areas and of the Howe and Rulo quadrangles, in Nemaha, Holt, and Richardson counties, Mr. McKinley and C. P. Gross ran 117 miles of primary levels and established 35 permanent bench marks.

New Mexico.—The survey of the Alum Mountain quadrangle (formerly called Camp Vincent), in the Datil and Gila national forests, Grant and Socorro counties, was completed by A. B. Searle and F. H. Nelson, the area mapped being 476 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. The survey of the Raton quadrangle, in Colfax County, was continued by E. P. Davis and S. E. Taylor, the area mapped being 126 square miles, for publication on the scale of 1:62,500, with a contour interval of 50 feet. A survey was made by C. J. Ballinger of a portion of the Tularosa Desert, covering an area of 1,349 square miles, for publication on the scale of 1:125,000, with a contour interval of 50 feet. This work covered portions of the Tularosa, Gypsum Hills, Alamogordo, Tonuco, and Soudders quadrangles, in Otero County. For the control of the Raton quadrangle, Mr. Taylor and C. P. Gross ran 96 miles of primary levels and established 21 permanent bench marks and R. B. Robertson occupied 10 and marked 12 triangulation stations. For the control of the Alum Mountain quadrangle Mr. Robertson occupied 8 triangulation stations and marked 1.

Oklahoma.—The Director of the Oklahoma Geological Survey allotted \$1,000 for cooperative topographic surveys in that State and the Federal Geological Survey allotted a like sum. The survey of the Hominy quadrangle, in Payne and Tulsa counties, was begun in cooperation, but after the expenditure of all cooperative funds field

work was continued under an additional Federal allotment. The area mapped was 566 square miles, for publication on the scale of 1:125,000, with a contour interval of 50 feet; of this area 62 square miles comprised a resurvey of a portion of the old Indian Territory survey. This work was done by Basil Duke, S. T. Penick, S. E. Taylor, C. P. McKinley, and C. W. Rowell. For the control of the Hominy quadrangle H. L. Caldwell ran 338 miles of primary levels and established 69 permanent bench marks.

In addition to the cooperative work in Oklahoma the resurvey of the Vinita quadrangle, comprising 957 square miles in Craig, Nowata, Mayes, Ottawa, Delaware, and Rogers counties, was completed by S. E. Taylor, C. P. McKinley, G. W. Lucas, and C. C. Holder, for publication on the scale of 1:125,000, with a contour interval of 50 feet. For the control of the Washunga quadrangle, in Grant and Kay counties, R. M. Copeland ran 235 miles of primary levels and established 72 permanent bench marks. (See also p. 114.)

Texas.—The survey of the Daingerfield quadrangle, comprising 250 square miles in Morris and Cass counties, was completed by C. P. McKinley and C. C. Holder, for publication on the scale of 1:62,500, with a contour interval of 25 feet, and that of the unmapped portions of the Gay Hill and Navasota quadrangles, covering 330 square miles in Burleson, Brazos, Washington, and Grimes counties, was completed by S. E. Taylor and C. A. Ecklund, for publication on the same scale and with the same contour interval. For the control of the Gay Hill and Navasota quadrangles Mr. Taylor and Mr. Ecklund ran 73 miles of primary levels and established 18 permanent bench marks.

Wyoming.—The survey of the Meeteetse quadrangle, comprising 215 square miles in Park County, and of the unmapped portion of the Oregon Basin quadrangle (formerly called Wiley), covering 49 square miles in Park County, was completed by C. C. Gardner, L. V. Fees, and C. C. Holder, for publication on the scale of 1:62,500, with a contour interval of 25 feet. The survey of the Cheyenne quadrangle, in Laramie County, was completed by Basil Duke and H. L. Caldwell, the area mapped being 746 square miles, for publication on the scale of 1:125,000, with a contour interval of 50 feet. The resurvey of the Hanna quadrangle (northeast quarter of the old Fort Steele 30-minute quadrangle), in Carbon County, was begun by F. E. Matthes, A. O. Burkland, J. H. Wilke, and C. J. Ballinger, the area mapped being 218 square miles, for publication on the scale of 1:62,500, with a contour interval of 25 feet. For the control of the Meeteetse quadrangle Mr. Gardner ran 6 miles of primary levels and established 2 permanent bench marks, for the control of the Cheyenne quadrangle Mr. Caldwell ran 72 miles of primary levels and established 23 permanent bench marks, and for the control of

the Hanna quadrangle Mr. Ballinger ran 51 miles of primary levels and established 10 permanent marks.

In addition to this work, the Wyoming portion of the Patrick quadrangle, in Goshen County, was partly revised by Lee Morrison.

OFFICE WORK.

The drafting of the following sheets was completed: Hahns Peak, Mesa Verde National Park, Red Mesa, Castle Rock, Leadville mining district, Ignacio (portion resurveyed), Colo.; Brockton, Homestead, Marias Pass, Clark Fork, Mont.; Alum Mountain, Silver City (small area revised), and Alamo National Forest, N. Mex.; Cheyenne, Oregon Basin, Meeteetse, and Green River, Wyo.; Daingerfield and Navasota, Tex.; Antlers, Claremore, and Nowata, Okla. (revision).

Progress in the drafting of additional sheets was made as follows: Chromo, Colo., 52 per cent; Meeker, Colo., 78 per cent; Grand River, Colo., 70 per cent; Divide, Mont., 19 per cent; Willis, Mont., 7 per cent; Marston, Mont., 15 per cent; Nyack, Mont., 63 per cent; Nemaha, Nebr., 41 per cent; Raton, N. Mex., 60 per cent; Tularosa, N. Mex., 63 per cent; Alamagordo, N. Mex., 3 per cent; Gypsum Hills, N. Mex., 66 per cent; Souders, N. Mex., 2 per cent; Tonuco, N. Mex., 1 per cent; Hanna, Wyo., 84 per cent.

In the computing section the following computations and adjustments were made:

Primary-level circuits were adjusted and geodetic distances and positions were computed for the Leadville quadrangle (Colo.). Primary-level circuits were adjusted in the Apishapa, Cortez, Elmore, Hahns Peak, La Plata, Lewis Creek, Mancos, Meeker, North Park, Red Mesa, and Spanish Peaks quadrangles (Colo.).

Primary-level circuits in the Brockton and Sand Butte quadrangles (Mont.) were adjusted.

Primary-level circuits were adjusted and geodetic distances and positions were computed for the Raton quadrangle (N. Mex.). Geodetic distances and positions were computed for the Alum Mountain, Black Range, Laura Spring, Mogollon, Silver City, Steeple Rock, and Tonuco quadrangles (N. Mex.).

Primary-level circuits in the Navasota quadrangle (Tex.) were adjusted.

Primary-level circuits in the Cheyenne quadrangle (Wyo.) were adjusted.

PACIFIC DIVISION.

FIELD WORK.

SUMMARY.

During the season topographic mapping was carried on in Arizona, California, Idaho (including portions of quadrangles in Mon-

tana), Oregon, Utah, and Washington. This work comprised the survey of 4 quadrangles, the partial survey of 48 quadrangles and 1 national park, the partial resurvey of 2 quadrangles, the revision of 1 quadrangle and 1 special area, and the partial revision of 1 quadrangle. The total new area mapped was 11,846 square miles—6,913 for publication on the scale of 1:250,000, 2,648 for publication on the scale of 1:125,000, 1,364 for publication on the scale of 1:62,500, and 921 for publication on the scale of 1:31,680. The area resurveyed was 1,016 square miles—851 for publication on the scale of 1:125,000 and 165 for publication on the scale of 1:62,500.

In connection with this work 1,194 miles of primary levels were run and 309 permanent bench marks were established. In addition, profile surveys were made of 12 rivers, the distance traversed being 969 miles, in connection with which 100 square miles were surveyed for publication on the scale of 1:31,680.

Topographic surveys were made in the Territory of Hawaii, covering portions of one island, embracing parts of eight 15-minute quadrangles and one special area, the area mapped being 281 square miles, for publication on the scale of 1:31,680, in connection with which 77 miles of primary levels were run and 20 permanent bench marks were established.

Primary triangulation and primary traverse were carried on at different times by three parties, the work being distributed over portions of California, Oregon, and Washington. The total area covered by this primary control was about 5,806 square miles, of which 529 were controlled by primary traverse, 206 miles being run and 74 permanent marks set. Twenty-three triangulation stations were occupied and 15 were marked. The results of this work made control available in 5 quadrangles and 1 national park.

Topographic surveys in Pacific division from July 1, 1911, to June 30, 1912.

State.	Contour interval.	For publication on scale of—						Total area surveyed.	Primary levels.		Primary traverse.			
		1:250,000.		1:125,000.		1:62,500.			1:31,680.		Distance run.	Bench marks.	Distance run.	Permanent marks.
		New.	New.	Resurvey.	New.	Resurvey.	New.							
	Feet.	Sq. mi.	Sq. mi.	Sq. mi.	Sq. mi.	Sq. mi.	Sq. mi.	Sq. mi.	Mi.		Mi.			
Arizona.....	25				25			25						
California.....	5, 25, 100, 200	1, 918	1, 301	851	214		552	4, 836	56	13				
Idaho.....	25, 50, 100, 200	4, 397	365		309			5, 071	424	117				
Montana.....	200	598						598	6	2				
Oregon.....	5, 25, 100		460		365		317	1, 142	604	151	206	74		
Utah.....	20, 50					165		165						
Washington.....	5, 10, 25, 100		522		451		52	1, 025	104	26				
Hawaii.....	10, 25, 50	6, 913	2, 648	851	1, 364	165	921	12, 862	1, 194	309	206	74		
							281	281	77	20				

a 53 miles precise levels.

DETAILS OF WORK BY STATES.

Arizona.—The survey of the Phoenix quadrangle, in Maricopa County, was completed by T. P. Pendleton, the area mapped being 25 square miles, for publication on the scale of 1:62,500, with a contour interval of 25 feet. Culture was also brought up to date on the part of this quadrangle previously mapped.

California.—The Department of Engineering of California allotted \$14,000 for the continuation of cooperative topographic surveys in that State, and the United States Geological Survey allotted a like sum. In the San Joaquin Valley the survey of the Holt, Woodward Island, Byron Hot Springs, and Bethany 7½-minute quadrangles and of the unmapped portions of the Stockton and Brentwood 7½-minute quadrangles, in San Joaquin, Contra Costa, and Alameda counties, was completed by Duncan Hannegan and J. L. Lewis, the area mapped being 296 square miles, for publication on the scale of 1:31,680, with a contour interval of 5 feet. The survey of the Union Island 7½-minute quadrangle, in San Joaquin County, was begun by Mr. Hannegan, J. P. Harrison, and Mr. Lewis, the area mapped being 27 square miles, for publication on the scale of 1:31,680, with a contour interval of 5 feet.

In the Salinas Valley the survey of the Metz, King City, San Ardo (the southwest quarter of the Priest Valley 30-minute quadrangle, which is being mapped on a scale of 1:125,000), and Bradley 15-minute quadrangles was begun and that of the Soledad 15-minute quadrangle was continued, the area mapped being 229 square miles in Monterey and San Luis Obispo counties, for publication on the scale of 1:31,680, with contour intervals of 5 and 25 feet. This work was done by Duncan Hannegan, Charles Hartmann, jr., E. R. Bartlett, and R. M. LaFollette.

In addition to the regular cooperative surveys in California the State Board of Control (Water Powers) made an allotment of \$7,000 for cooperative river surveys, the United States Geological Survey making no allotment but detailing its men to carry on the work. Under this plan profile surveys were made of the North, Middle, and South forks of American River, the Middle Fork of Feather River, Pit River, and Tuolumne River, the total distance traversed being 367 miles, in Sacramento, Placer, Eldorado, Butte, Plumas, Shasta, Lassen, Tuolumne, and Stanislaus counties. This work was done by J. G. Staack, J. P. Harrison, Charles Hartmann, jr., and T. J. Pendleton.

In addition to the cooperative work in California, the survey of the land area of the Monterey quadrangle, covering 148 square miles in Monterey County, was completed by C. F. Eberly and Cornelius Schnurr, for publication on the scale of 1:62,500, with a contour in-

terval of 25 feet. For the control of the Monterey quadrangle Mr. Schnurr ran 56 miles of primary levels and established 13 permanent bench marks. The survey of the Capitola quadrangle, in Monterey and Santa Cruz counties, was begun by E. R. Bartlett, the area mapped being 27 square miles, for publication on the scale of 1:62,500, with a contour interval of 25 feet.

The survey of the unmapped portion of the Big Bar quadrangle, covering 16 square miles in the Trinity National Forest, was completed, and that of the Sawyers Bar quadrangle, in the same national forest, Trinity, Humboldt, and Siskiyou counties, was begun, the area mapped being 359 square miles, for publication on the scale of 1:250,000, with a contour interval of 200 feet. This work was done by J. P. Harrison. The resurvey of the Weaverville quadrangle (the northwest quarter of the old Red Bluff 1-degree quadrangle), lying partly in the Trinity National Forest, Trinity and Shasta counties, was completed by Oscar Jones, Bayard Knock, and K. W. Trimble, the area resurveyed being 851 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet.

The survey of the unmapped portion of the Bishop quadrangle, covering 205 square miles in Inyo and Mono counties, was completed, and that of the Long Valley quadrangle, lying partly in the Inyo and Mono national forests, Mono County, was begun by B. A. Jenkins, the area mapped being 435 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet.

The survey of the Borax Flat quadrangle, lying partly in the Sequoia National Forest, San Bernardino and Kern counties, was begun by J. P. Harrison and L. R. Ebert, the area mapped being 1,543 square miles, for publication on the scale of 1:250,000, with a contour interval of 100 feet. For the control of this quadrangle C. F. Urquhart and Charles Hartmann, jr., occupied 16 and marked 14 triangulation stations.

The survey of the unmapped portion of the Caliente quadrangle, covering 301 square miles in Kern County, was completed by J. W. Muller and K. W. Trimble, for publication on the scale of 1:125,000, with a contour interval of 100 feet.

The survey of the Petaluma quadrangle, in Sonoma and Marin counties, was continued by Bayard Knock, the area mapped being 39 square miles, for publication on the scale of 1:62,500, with a contour interval of 25 feet.

The survey of the unmapped portion of the Priest Valley quadrangle, lying partly in the Monterey National Forest, Monterey, San Benito, and Fresno counties (a portion of which was covered by the survey of the Coalinga oil district), was begun by B. A. Jenkins, D. H. Watson, and R. M. LaFollette, the area mapped being 360

square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet.

Idaho.—The survey of the Slug Creek quadrangle was completed and that of the Wayan, Freedom, Henry, and Preuss Range quadrangles, in Bear Lake and Bannock counties, was continued by Albert Pike, the area mapped being 309 square miles, for publication on the scale of 1:62,500, with a contour interval of 50 feet. Field work on 205 square miles of this area was done on a scale of 1:31,680. (Work on this same area was reported last year as done in the Wayan 30-minute quadrangle.) For the control of the Wayan quadrangle D. S. Birkett ran 37 miles of primary levels and established 11 permanent bench marks. For the control of the Chatcolet and Fernwood quadrangles, in Kootenai and Shoshone counties, Mr. Birkett ran 93 miles of primary levels and established 30 permanent bench marks.

A profile survey of Salmon River, in Idaho and Adams counties, was made by O. G. Taylor, the distance traversed being 108 miles.

Idaho-Montana.—The survey of the Idaho portions of the Taft and St. Regis quadrangles, in Shoshone County, was continued by J. E. Blackburn and C. L. McWhorter, the area mapped being 365 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. For the control of the Idaho portions of this area D. S. Birkett ran 29 miles of primary levels and established 8 permanent bench marks, and for the control of the Montana portion of this area Mr. Birkett ran 6 miles of primary levels and established two permanent bench marks.

The survey of the Priest Lake 1-degree quadrangle (formerly called Panhandle), lying partly in the Pend Oreille and Kaniksu national forests, Bonner, Kootenai, Lincoln, and Shoshone counties, Idaho, and Flathead and Sanders counties, Mont., was completed by T. P. Pendleton and J. W. Muller, the area mapped being 1,320 square miles, for publication on the scale of 1:250,000, with a contour interval of 200 feet. Of the area mapped 163 square miles lie in Montana. In connection with this work the Sand Point 30-minute quadrangle, forming the southeast quarter of the Priest Lake quadrangle, was completely revised.

The survey of the Lolo quadrangle, in the Clearwater National Forest, was completed, and that of the Washington Creek, Weippe, and Quartz quadrangles, in the same forest, was begun, the total area mapped being 3,675 square miles, for publication on the scale of 1:250,000, with a contour interval of 200 feet. Of this area 3,240 square miles lie in Clearwater, Idaho, and Nez Perce counties, Idaho, and 435 square miles in Missoula County, Mont. This work was done by T. M. Bannon, J. G. Staack, and S. G. Lunde. For the control of this area L. F. Biggs ran 265 miles of primary levels and

established 68 permanent bench marks, all of the control being in Idaho.

Oregon.—The State engineer of Oregon allotted \$15,000 for the continuation of cooperative topographic surveys in that State and the United States Geological Survey allotted a like sum. The survey of the Willamette Valley was continued and resulted in the partial mapping of the Brownsville, Lebanon, Monroe, Albany, and Corvallis 15-minute quadrangles, in Linn, Benton, and Marion counties, the total area mapped being 269 square miles, for publication on the scale of 1:31,680, with contour intervals of 5 and 25 feet. This work was done by E. R. Bartlett, A. J. Ogle, J. M. Rawls, and A. F. McNair. For the control of these areas Mr. Bartlett, E. M. Bandli, and A. G. Humphrey ran 189 miles of primary levels and established 45 permanent bench marks and C. F. Urquhart ran 149 miles of primary traverse and set 60 permanent marks.

The survey of the Oregon City and Boring quadrangles and the Oregon portion of the Troutdale quadrangle, in Clackamas and Multnomah counties, was continued by J. H. Wheat, A. E. Murlin, O. G. Taylor, L. R. Ebert, D. H. Watson, and H. S. Leicht, the area mapped being 365 square miles, for publication on the scale of 1:62,500, with a contour interval of 25 feet. For the control of these areas E. M. Bandli ran 78 miles of primary levels and established 21 permanent bench marks and C. F. Urquhart and Mr. Bandli ran 57 miles of primary traverse and set 14 permanent bench marks.

The survey of the Pine quadrangle, lying partly in the Wallowa National Forest, Baker County, was continued by G. S. Smith, the area mapped being 460 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. For the control of this quadrangle D. S. Birkett ran 69 miles of primary levels and established 21 permanent bench marks.

In addition to the regular cooperative topographic work in Oregon, profile surveys of Deschutes and Metolius rivers were made in Crook, Sherman, and Wasco counties, in connection with water-power investigations being carried on by the water-resources branch in cooperation with the State of Oregon. The distance traversed in the Deschutes River survey was 253 miles, in connection with which an area of 48 square miles, included in the Lava, Cline Falls, and Maiden Peak quadrangles, was mapped, for publication on the scale of 1:31,680, with a contour interval of 5 feet. This work was done by A. T. Fowler and O. G. Taylor. For the control of this area Mr. Fowler, D. S. Birkett, and Paul Hegdahl ran 268 miles of primary levels and established 64 permanent bench marks. The Metolius River survey was begun in June, 1912, and included the traversing of 14 miles.

Utah.—The resurvey of the Sunnyside quadrangle (a portion of the old Price River quadrangle), in Carbon County, was completed by S. P. Floore, the area mapped being 165 square miles, for publication on the scale of 1:62,500, with a contour interval of 50 feet. The revision of the Tintic mining district, covering an area of 12 square miles in Juab and Utah counties, was completed by W. M. Beaman, for publication on the scale of 1:9,600, with a contour interval of 20 feet.

Washington.—The Board of Geological Survey of Washington allotted \$13,750 for the continuation of cooperative topographic surveys and the United States Geological Survey allotted a like sum. The survey of the Cedar Lake quadrangle, lying partly in the Snoqualmie and Rainier national forests, King and Pierce counties, was completed by W. O. Tufts, L. R. Ebert, R. B. Kilgore, F. A. Danforth, and E. L. Thomason, the area mapped being 427 square miles, for publication on the scale of 1:125,000, with a contour interval of 100 feet. The survey of the Palisades quadrangle, in Grant County, was continued and that of the Malaga quadrangle, in Grant and Douglas counties, was begun by H. L. McDonald, the area mapped being 130 square miles, for publication on the scale of 1:62,500, with a contour interval of 25 feet. The survey of the Wenatchee quadrangle, lying partly in the Wenatchee National Forest, Douglas County, was begun by Mr. McDonald, the area mapped being 20 square miles, for publication on the scale of 1:62,500, with a contour interval of 25 feet. For the control of the Malaga quadrangle Mr. McDonald ran 16 miles of primary levels and established 5 permanent bench marks. The survey of a portion of the Grays Harbor quadrangle, covering an area of 160 square miles in Chehalis County, was completed by Charles Hartmann, jr., R. R. Randell, and G. L. Hagman, for publication on the scale of 1:62,500, with a contour interval of 25 feet. For the control of the Grays Harbor quadrangle Mr. Hagman ran 88 miles of primary levels and established 21 permanent bench marks.

A profile survey of Wenatchee River, in Chelan County, was made by Charles Hartmann, jr., and T. H. Moncure, the distance traversed being 119 linear miles, in connection with which 26 square miles were mapped, for publication on the scale of 1:31,680, with contour intervals of 5 and 10 feet. A profile survey of Snoqualmie River, in King County, was made by R. M. La Follette, the distance traversed being 50 linear miles, in connection with which 15 square miles were mapped, for publication on the scale of 1:31,680, with contour intervals of 5 and 25 feet. A profile survey of Clealum River, in Kittitas County, was made by Mr. Moncure, the distance traversed being 58 linear miles, in connection with which 11 square miles were mapped,

for publication on the scale of 1:31,680, with a contour interval of 5 feet.

In addition to the cooperative work in Washington, the survey of the Mount Rainier National Park, in Pierce County, was continued by G. R. Davis and F. E. Matthes, the area mapped being 141 square miles, for publication on the scale of 1:62,500, with a contour interval of 100 feet. For the control of this area C. F. Urquhart occupied 7 triangulation stations and marked 1.

Washington-Oregon.—The survey of the Mount Hood quadrangle (formerly called the Mount Hood special area), in Skamania County, Wash., and Multnomah and Hood River counties, Oreg., was completed by R. M. La Follette, for publication on the scale of 1:125,000, with a contour interval of 100 feet, the work during this season covering an area of 95 square miles in the Washington portion.

Hawaii.—Cooperative topographic surveys were continued in the Hawaiian Islands under an arrangement similar to that of the previous fiscal year, the Territory allotting \$15,000 and the United States Geological Survey allotting \$5,000. The survey of the island of Hawaii was continued, the area mapped being 237 square miles, for publication on the scale of 1:31,680, with contour intervals of 10 and 50 feet. This work covered portions of the Hamakua, Kohala, Honomu, Mauna Kea, and Waipio 15-minute quadrangles and was done by C. H. Birdseye, A. O. Burkland, J. M. Rawls, J. H. Ballinger, and Sidney Birdseye. For the control of the Kohala quadrangle Sidney Birdseye ran 19 miles of primary levels and established 3 permanent bench marks, and for the control of the Honomu quadrangle Mr. Burkland ran 5 miles of primary levels and established 1 permanent bench mark.

In addition to the regular cooperative work, a special survey of the area embracing the proposed national park around Kilauea Crater, island of Hawaii, was made by C. H. Birdseye and Mr. Burkland for the Territorial Government, all expenses being borne by the Territory. The area mapped was 44 square miles, for publication on the scale of 1:31,680, with a contour interval of 25 feet. For the control of this area, J. M. Rawls ran 53 miles of precise levels and established 16 permanent bench marks.

OFFICE WORK.

The drafting of the following sheets was completed: Winkelman, Ariz.; Bakersfield, Ballarat, Bethany, Big Bar, Bishop, Brentwood, Byron Hot Springs, Caliente, Coalinga, Holt, Lida, Monterey, Mount Goddard, Panoche, Stockton, Weaverville, and Woodward Island, Cal.; special map of proposed Kilauea Volcano National Park, Hawaii; Slug Creek and Salmon River, Idaho; Lolo and

Priest Lake, Idaho-Mont.; Deschutes River, Oreg.; Mount Hood, Oreg.-Wash.; Sunnyside and Tintic mining district (revision), Utah; Cedar Lake, Clealum River, Tieton River, and Wenatchee River, Wash.

Progress in the drafting of additional sheets was made as follows: Phoenix, Ariz. (revision), 87 per cent; Long Valley, Cal., 45 per cent; Metz, Cal., 80 per cent; Petaluma, Cal., 32 per cent; Sawyers Bar, Cal., 20 per cent; Soledad, Cal., 98 per cent; Waipio No. 6, Hawaii, 73 per cent; Waipio No. 7, Hawaii, 5 per cent; Hamakua No. 5, Hawaii, 32 per cent; Preuss Range, Idaho, 45 per cent; Henry, Idaho, 20 per cent; Wayan, Idaho, 80 per cent; Washington Creek, Idaho, 13 per cent; Weippe, Idaho, 24 per cent; St. Regis, Idaho-Mont., 30 per cent; Taft, Idaho-Mont., 32 per cent; Quartz, Mont., 5 per cent; Albany, Oreg., 36 per cent; Boring, Oreg., 95 per cent; Brownsville, Oreg., 11 per cent; Cazadero, Oreg., 8 per cent; Corvallis, Oreg., 3 per cent; Lebanon, Oreg., 25 per cent; Monroe, Oreg., 50 per cent; Oregon City, Oreg., 45 per cent; Pine, Oreg., 60 per cent; Malaga, Wash., 48 per cent; Mount Rainier, Wash., 55 per cent; Palisades, Wash., 27 per cent; Snoqualmie River, Wash., 75 per cent; Wenatchee, Wash., 5 per cent; Cispus River, Wash., 30 per cent (field work by water-resources branch).

In the computing section the following computations and adjustments were made:

Primary-level circuits were adjusted and geodetic distances and positions were computed for the Avena, Clyde, Copperopolis, Manteca, Peters, and Trigo quadrangles (Cal.). Primary-level circuits in the Monterey quadrangle (Cal.) were adjusted. Geodetic distances and positions were computed in the Banta, Borax Flat, Byron, Holt, Lathrop, Oakdale, Stockton, Tracy, and Union Island quadrangles (Cal.).

Primary-level circuits were adjusted in the Chatcolet Station, Fernwood, Henry, Kamiah, Kendrick, Soda Springs, Summit Lake, Crags Mountains, Wayan, and Weippe (Idaho), Asotin and Lapwai (Idaho-Wash.), Fish Creek, Pot Mountain, and Taft (Idaho-Mont.), and Freedom, Montpelier, and Preuss Range (Idaho-Wyo.) quadrangles.

Primary-level circuits were adjusted and geographic positions were computed for the Albany, Lebanon, Oregon City, and Reedville quadrangles (Oreg.). Primary-level circuits were adjusted in the Baker City, Birch Creek, Brownsville, Cline Falls, Corvallis, Dufur, Lava, Madras, Maiden Peak, Monroe, Moro, Pine, and Prineville (Oreg.) and Goldendale (Oreg.-Wash.) quadrangles. Geographic positions for the Aumsville, Boring, and Salem quadrangles (Oreg.) were computed.

Primary-level circuits were adjusted in the Cape Elizabeth, Grays Harbor, Humptulips, Palisades, and Point Hanson quadrangles (Wash.). Geodetic distances and positions for the Mount Rainier quadrangle (Wash.) were computed.

INSPECTION OF TOPOGRAPHIC SURVEYING AND MAPPING.

The field time of the inspectors was divided between inspection duty and special topographic work. J. H. Renshawe spent the season in inspecting the current work of field parties in portions of the Atlantic and Central divisions. W. M. Beaman, after examining and revising the large-scale Tintic mining map, comprising 12 square miles in Juab and Utah counties, Utah, was engaged during the remainder of the field season in the inspection of river surveys and other current topographic work in the Rocky Mountain and Pacific divisions. F. E. Matthes spent the regular field season in topographic work on the map of the Mount Rainier National Park, Wash., completing 51 square miles, and in October spent two weeks in topographic work on the Hanna quadrangle, Wyo. Since January Mr. Matthes has been engaged in office drafting of his field sheet and the preparation of several reports on national parks for publication by the Department of the Interior.

The office duties of Messrs. Renshawe and Beaman involved a careful supervision of the inking and preparation of the final drawings of the topographic branch and their examination prior to submission for engraving or photolithography. Mr. Beaman's duties also included the examination and transmission of land classification, woodland, and other special information, attention to referred matters largely from the editor of topographic maps, and the proper transmission of all original topographic map manuscript.

INSTRUMENTS AND TOPOGRAPHIC RECORDS.

As in past years, the repairs to all topographic instruments were made under the supervision of E. M. Douglas, who is also in charge of the topographic records.

The principal instruments repaired in the Survey shop consist of 179 telescopic alidades, 67 Y levels, 10 prism levels, 14 transits, 60 tripods, 240 box compasses, 28 pocket, clinometer, and other compasses, and 30 Locke levels. In addition to these, over 1,700 smaller articles were repaired. The principal repairs made by outside contractors were those to leveling rods, for the repair of which the Survey has no facilities.

The additions to the topographic records consisted of 250 triangulation or primary traverse books, 370 level books, 225 vertical-angle

or stadia books, and 50 plane-table sheets, all of which have been numbered and catalogued.

MAP OF THE UNITED STATES.

Of the work in progress last year on the 1:1,000,000 scale map of the United States, under the direction of A. F. Hassan, base maps of the following States have been completed: Alabama (portions of sheets H and I 16), Delaware (portion of sheet J 18), Georgia (portions of sheets H and I 16 and 17), Mississippi (portions of sheets H and I 15 and 16), New Jersey (portions of sheets J and K 18), New York (portions of sheets K 17 and K and L 18), Pennsylvania (portions of sheets J and K 17 and 18), Tennessee (portions of sheets I 15 and I and J 16 and 17), and Wyoming (portions of sheets K and L 12 and 13). These State maps, with portions of other States which have been compiled, complete the bases of the following international sheets: North H 16, North H 17, North I 16, North J 18, and North K 18. Additional work included the lettering of 60 per cent of the base map of Montana (portions of sheets L and M 11, 12, and 13) and the compilation and inking of 35 per cent of sheets I and J 10 (California).

In addition to the work on the 1:1,000,000 scale map, 75 per cent of the contour revision of the three-sheet map of the United States was completed and 33 special maps were prepared for other branches of the Government.

WATER-RESOURCES BRANCH.

GENERAL SCOPE OF WORK.

The work of the water-resources branch has been continued under the administrative plan described in last year's report. Though the appropriation (\$150,000) was the same as that for the previous year, the scope of the work has been considerably increased in certain sections of the country. This increase has been made possible by additional cooperative moneys allotted by certain States and, in New Hampshire, by the necessity for an intensive hydrometric investigation in the White Mountain area under the authority of the Weeks Act.

ALLOTMENTS.

The allotments of the appropriation for the fiscal year were as follows:

Administrative expenses of the Survey.....	\$10,761. 67
Clerical assistance	5,200. 00
Computation, reports, and technical studies.....	9,200. 00

Stream gaging in—

New England and New York.....	\$4,850.00
Virginia, South Carolina, North Carolina, Georgia, Alabama, Mississippi, and Tennessee.....	4,000.00
West Virginia, Kentucky, Ohio, Indiana, and Illinois.....	8,000.00
Minnesota.....	10,000.00
Texas.....	1,000.00
Southern Wyoming, Colorado, and New Mexico.....	8,175.00
Northern Wyoming, Montana, and North Dakota.....	7,000.00
Idaho, Utah, and Nevada.....	8,750.00
Washington and Oregon.....	12,000.00
California.....	5,580.00
Nevada and Arizona.....	4,870.00
Hawaii.....	5,000.00
Investigation of ground waters, including quality of waters.....	17,500.00
Land-classification board.....	11,844.00
Water-power investigations.....	14,969.33
Deschutes River investigation.....	1,500.00
	150,000.00

Of the total appropriation 83.5 per cent was allotted for work in the public-land States.

COOPERATION.

STATES.

Cooperation with several States has been maintained as described in previous reports. The States and the amounts allotted by them are as follows:

Amounts allotted by States for cooperative work with United States Geological Survey in investigation of water resources.

California:

State engineer.....	\$9,000
Conservation Commission.....	12,000
Board of Control.....	4,000
	\$25,000.00

Colorado.....	167.10
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Hawaii.....	12,000.00
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Idaho.....	12,000.00
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Illinois.....	2,191.37
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Maine.....	1,350.00
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Minnesota.....	16,000.00
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Massachusetts.....	1,000.00
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Montana.....	3,000.00
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New York:

State engineer.....	\$1,500.00
Water-Supply Commission.....	1,976.30
Conservation Commission.....	10,000.00
	13,476.30

New Mexico.....	4,258.15
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Oregon:	
For stream gagings.....	\$8, 419. 47
For analyses of waters.....	2, 000. 00
For Deschutes River investigation.....	3, 000. 00
	\$13, 419. 47
Tennessee.....	718. 22
Utah.....	2, 521. 47
Vermont.....	1, 000. 00
Washington.....	4, 419. 31
Wyoming.....	200. 00
	112, 721. 39

The work performed under the cooperative agreements is outlined in the following paragraphs.

California.—Three separate agreements have been in effect in California during the year. The first is a continuation of the one that has been in force during previous years, the State cooperating through the office of the State engineer under a continuing authority and appropriation enacted by the California Legislature in 1909. Under this agreement the sum of \$9,000 has been expended by each party and the work has been confined to the maintenance of river-flow measurement stations previously established and a study of the occurrence and availability of underground waters. The second agreement was executed with the Conservation Commission of California, under which the commission allotted to the Geological Survey, for the purpose of establishing and maintaining 60 river-measurement stations, the sum of \$12,500. The work under this agreement was carried on in connection with that provided under the agreement first mentioned. The third agreement was executed with the State Board of Control (Water Powers), under which the board allotted to the Geological Survey the sum of \$4,000 to be used in the preparation of reports containing the results of all hydrometric investigations that have been maintained in the State since the beginning of the work there. The preparation of these reports was nearly completed at the end of the fiscal year.

Colorado.—Cooperation in Colorado was maintained through the office of the State engineer, who assumed the cost of maintaining certain flow-measurement stations, the total contribution being given in the foregoing table.

Hawaii.—The cooperative work in Hawaii, under an agreement executed by the Geological Survey and the Territorial government, consisted of the determination of stream flow, the measurement of precipitation, and incidental studies of water losses occasioned by seepage in irrigation canals. The sum of \$5,000 was allotted by the Geological Survey and \$12,000 by the Territory.

Idaho.—Two cooperative agreements between the Geological Survey and the Idaho State Land Board have been in force during the

year. The first, executed on July 1, 1911, provided for the expenditure of \$5,000 by each party in the maintenance of stream-flow investigations. Owing to the increasing importance of the investigations in Idaho, the State was made a separate district of the Survey on September 1, 1911, and a new agreement was made covering the period between that date and January 1, 1913, under which the Geological Survey agreed to allot the sum of \$8,600 and the State the sum of \$11,350.

Illinois.—The cooperative work in Illinois has consisted of the maintenance of stream-flow measurement stations under the joint direction of the Geological Survey and the Rivers and Lakes Commission of Illinois. All the expenses of this work except those for supervision, computations, and publication of results have been borne by the State, the amount expended by it being \$2,200.

Maine.—Under a cooperative agreement with the Maine State Water Storage Commission the sum of \$1,350 was allotted for the maintenance of stream-flow measurements during the fiscal year.

Massachusetts.—A cooperative agreement between the Geological Survey and the governor of the Commonwealth of Massachusetts executed on January 2, 1912, provided that between that date and June 30, 1912, each party should contribute the sum of \$1,000 for the measurement of the flow of streams within the Commonwealth.

Minnesota.—The Minnesota State Drainage Commission has cooperated with the Geological Survey during the fiscal year in the maintenance of stream-flow measurements and the survey of river profiles. The amount allotted by the commission was \$16,000 and by the Survey \$10,000.

Montana.—Cooperation was maintained between the Geological Survey and the Carey Land Act Board of Montana, under which each party expended the sum of \$3,000 in the maintenance of stream-flow measurements.

New Mexico.—Cooperation with New Mexico has consisted in the payment of certain expenses by the State engineer. It involved the maintenance of stream-flow measurement stations previously established. The amount expended by the Geological Survey was \$2,500 and by the State \$4,258.

New York.—Two cooperative agreements were in force in New York, one with the State engineer and the other with the New York Conservation Commission and its predecessor, the Water-Supply Commission. The work was confined to the determination of stream flow for the purpose of municipal supply, development of water power, and flood prevention. The amount expended by the Geological Survey was \$2,500, by the State engineer \$1,500, and by the Conservation Commission \$10,000.

Oregon.—The cooperation in Oregon, arranged with the office of the State engineer, consisted of three agreements—first, for the determination of stream flow; second, for a complete survey and investigation of the water powers of Deschutes and Metolius rivers; and, third, for an investigation or survey of the chemical composition of the river waters of the State for the purpose of determining their utility in municipal, agricultural, and manufacturing uses.

Tennessee.—Under an agreement with the State geologist of Tennessee a survey and stream-flow investigation of Doe River was begun for the purpose of making a report on the available water power of that stream. The expenditure by the State was \$718.22, that by the Geological Survey was \$254.54, and the difference will be expended during the present field season by the Survey to the end that the cost of the investigation may be equally divided between the two parties.

Utah.—The cooperative work carried on in conjunction with the State engineer of Utah during previous years, under which investigations were made of stream flow for use in irrigation and the development of water power, was continued during the past year, each party contributing the sum of \$2,500.

Vermont.—The cooperative work in Vermont consisted of the determination of stream flow, and under the agreement executed by the Geological Survey and the governor of the State each party contributed the sum of \$1,000.

Washington.—The cooperative work in Washington was in continuation of that maintained during previous years under an agreement executed by the governor, providing for investigation of stream flow for use in irrigation and the development of power and the preparation of reports on the water powers of the Cascade Range in conjunction with profile and reservoir surveys made by the topographic branch under a separate agreement.

Wyoming.—The State engineer of Wyoming and the Geological Survey have each expended the sum of \$200 in the maintenance of stream-flow measurement stations within the State.

RECLAMATION SERVICE.

Under the direction of the Reclamation Service and at the expense of the reclamation fund 131 stations have been maintained on Government irrigation projects by the Geological Survey. The arrangement for this work was the same as that described in the report for the fiscal year ended June 30, 1911.

OFFICE OF INDIAN AFFAIRS.

A large amount of work has been performed by the water-resources branch at the request of the Commissioner of Indian Affairs in con-

nection with the classification of lands within Indian reservations with regard to water powers and reservoir sites. The following is a detailed statement of the work so performed:

Blackfeet Reservation.—An investigation of the power and reservoir-site possibilities of the Blackfeet Reservation was made under an allotment of \$350. The report was completed and filed on July 31, 1911, at a cost of \$147.75.

Camp McDowell Reservation.—An investigation in the Camp McDowell Reservation was performed under authority dated July 18, 1911, the allotment being \$75. The report was filed March 21, 1912, the investigation being made at a total cost of \$102.55.

Colville Reservation.—An investigation of the water-power and reservoir-site possibilities of the Sanpoil and Nespelem River basins was performed under authority dated April 11, 1911, the allotment being \$500. The report thereon was filed September 27, 1911, the cost being \$498.80. Under a second authority, dated November 24, 1911, a similar investigation was made of that portion of the Colville Reservation not covered by the investigation above mentioned, under an allotment of \$150. The report was filed June 4, 1912, and the cost of the investigation was \$99.90. In addition to the foregoing work the sum of \$350 was allotted November 24, 1911, to be used in the maintenance of stream-flow investigations on the Colville Reservation up to June 30, 1912.

Crow Reservation.—Under authority dated March 30, 1911, an investigation of the Crow Reservation was made for the purpose of locating and establishing suitable river-flow measurement stations, the allotment therefor being \$110. A report on this investigation was filed November 2, 1911, the cost of the work being \$138.30. Under a further authority, dated November 29, 1911, the sum of \$550 was allotted for the maintenance of stations established under the previous investigation, up to June 30, 1912.

Fort Hall Reservation.—Under an agreement dated February 25, 1911, the sum of \$1,000 was allotted for the maintenance of river-flow measurement stations established in the Fort Hall Reservation under a previous agreement. Under further authority, dated July 1, 1911, the sum of \$226 was allotted for an investigation of water-power and reservoir-site possibilities on the reservation. The report on this investigation was filed August 10, 1911, the cost thereof being \$208.19.

Fort Peck Reservation.—An investigation of water-power and reservoir-site possibilities in the Fort Peck Reservation was authorized on August 4, 1911, the allotment therefor being \$300. The report was filed November 7, 1911, the total cost of the work being \$34.20.

Gila River Reservation.—Under an allotment of \$100, dated September 8, 1911, an investigation of water-power and reservoir-site possibilities was made in the Gila River Reservation. The report was filed March 21, 1912, the total cost of the work being \$113.72.

Klamath Reservation.—The Commissioner of Indian Affairs authorized, on March 30, 1911, the expenditure of \$350 for the maintenance during the period ending June 30, 1912, of gaging stations established in the Klamath Reservation under a previous agreement. On March 30, 1911, the sum of \$50 was allotted for a further reconnaissance of the Klamath Reservation for the purpose of locating and establishing additional gaging stations required in connection with the land-classification work. The report on this investigation was filed February 13, 1912, the cost of the work being \$26.95. Under date of March 6, 1912, a further allotment of \$300 was authorized for the maintenance of these stations up to June 30, 1912. An investigation of water-power and reservoir-site possibilities on this reservation was authorized October 12, 1911, the allotment therefor being \$200. A report was filed October 20, 1911, at an expense of \$49.95. The report was not acceptable, and a further investigation will be made during the present field season.

Menominee Reservation.—The maintenance of flow-measurement stations established in the Menominee Reservation under previous authority of the Office of Indian Affairs was continued during the past year under an allotment of \$600 made on January 1, 1912.

Moki and Navajo reservations.—The work on the Moki and Navajo reservations consisted of investigations of the occurrence and availability of underground waters in continuation of a previous authority and a special allotment of \$1,500 authorized by the Commissioner of Indian Affairs March 30, 1911.

Pine Ridge Reservation.—An investigation of water-power and reservoir-site possibilities in the Pine Ridge Reservation was authorized on February 20, 1912, under an allotment of \$500. A report was filed June 11, 1912.

Quinaelt Reservation.—The work in the Quinaelt Reservation consisted of two parts. An investigation of water-power and reservoir-site possibilities was authorized September 14, 1911, under an indefinite allotment. A report was filed December 13, 1911, the cost of which was \$139.22. In addition the Acting Commissioner allotted on January 19, 1912, the sum of \$50 for the maintenance of a river-flow measurement station on the reservation.

Rosebud and Pine Ridge reservations.—An allotment of \$225 was authorized on March 20, 1911, for the reconnaissance and establishment of river-flow measurement stations in the Rosebud and Pine Ridge reservations. A report thereon was filed October 21, 1911, the cost of which was \$261.91. The maintenance of the stations, estab-

lished at a cost to June 30, 1912, of \$490, was authorized November 24, 1911.

Rosebud Reservation.—An investigation of water-power and reservoir-site possibilities in the Rosebud Reservation was authorized on August 4, 1911, and the report filed October 21, 1911. The allotment for this work was \$100, and the ultimate cost \$98.50.

Salt River Reservation.—Under authority granted September 8, 1911, an examination of the Salt River Reservation for water-power and reservoir-site possibilities was undertaken under an allotment of \$100. A report was filed on March 21, 1912, the total cost thereof being \$102.52.

Standing Rock Reservation.—Under authority dated March 30, 1911, a reconnaissance of the Standing Rock Reservation for the purpose of locating and establishing stream-flow measurement stations was made during August and September, 1911, the allotment therefor being \$150. A report was filed on October 21, 1911, the total cost of which was \$103.76. Under date of November 24, 1911, an allotment of \$350 was authorized for the maintenance to July 1, 1912, of the stations established under the foregoing investigation. A further investigation relative to water-power and reservoir-site possibilities was made under an allotment of \$200, dated October 12, 1911. Report on this investigation was filed October 21, 1911, the ultimate cost thereof being \$137.71.

Warm Springs Reservation.—On March 28, 1911, the Commissioner of Indian Affairs authorized a reconnaissance of the Warm Springs Reservation for the location and establishment of stream-flow measurement stations. The work was performed in June, 1911, and a report filed October 12, 1911. The allotment for this investigation was \$60 and the ultimate cost \$60.40. Under date of February 12, 1912, an allotment of \$452 was authorized for the maintenance of the stations established until July 1, 1912. An investigation of water-power and reservoir-site possibilities on this reservation was begun under authority dated March 16, 1912, the allotment therefor being \$400. The field work in this investigation was performed during the month of June, 1912, but no report thereon was received until the close of the fiscal year.

Yakima Reservation.—The work in the Yakima Reservation consisted of the maintenance of stream-flow measurement stations established under previous authority. The allotment authorized for the fiscal year on March 30, 1911, was \$850.

FOREST SERVICE.

Cooperation with the Forest Service, described in the report for the fiscal year 1911, was continued during the past year. The num-

ber of stations maintained under this arrangement exceeds that for the previous year and is as follows:

Stream-gaging stations in national forests.

California	62	Oregon	19
Colorado	61	Utah	16
Idaho	20	Washington	18
Montana	18	Wyoming	12
New Mexico	7		

PUBLICATIONS.

The work of the water-resources branch is represented by the following publications issued during the year:

Bulletin 479; Water-Supply Papers 261, 266 to 269, 271 to 280, 282, 285 to 288, and 295. Titles and brief summaries of these publications are given on pages 29, 34-36. Water-Supply Papers 259, 283, 284, 289 to 294, 296, 298, 301, 304, and 311 were at the Government Printing Office at the close of the year. Seven manuscripts are in hand awaiting editorial work and 21 reports are in different stages of preparation. Reprints of the following water-supply papers, the original edition of which has been exhausted, were delivered during the year: 170, 172, 173, 174, 200, 201, 202, 203, 204, 206, 207, 208 (two reprints), 209 (two reprints), 210, 211, 213, 214 (two reprints), 219, 231, 232, 247, 248, 249, 255 (two reprints), 257, and 273. Bulletin 479 has also been reprinted.

DIVISION OF SURFACE WATERS.

ORGANIZATION.

The principal work of the division of surface waters consists of the measurement of the flow of rivers. In carrying on this work the United States has been divided into 15 districts, including Hawaii and Alaska.

In each district is maintained a central office under the supervision of a district engineer, with a corps of assistants. The following list gives the districts, the territory covered, and the district engineer and his headquarters:

Maine district, covering only the State of Maine. C. C. Babb, district engineer, State Capitol, Augusta, Me.

New York and New England district: New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, and New York. C. C. Covert, district engineer, Federal Building, Albany, N. Y.

Middle Atlantic district: Maryland, Virginia, and New Jersey. R. H. Bolster, district engineer, Washington, D. C.

Southeastern district: Alabama, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee. M. R. Hall, district engineer, Post Office Building, Atlanta, Ga.

Ohio Valley district: Illinois, Indiana, Iowa, Kentucky, Michigan, North Carolina, Ohio, Tennessee, Virginia, West Virginia, and Wisconsin: A. H. Horton, district engineer, Federal Building, Newport, Ky.

Upper Mississippi district: Minnesota and Wisconsin. W. G. Hoyt, district engineer, Old Capitol Building, St. Paul, Minn.

Upper Missouri district: Montana, North Dakota, and Wyoming. W. A. Lamb, district engineer, Montana National Bank Building, Helena, Mont.

Denver district: Colorado, Nebraska, New Mexico, South Dakota, and Wyoming. Robert Follansbee, district engineer, Chamber of Commerce Building, Denver, Colo.

Great Basin district: Utah, Wyoming, and Nevada. E. A. Porter, district engineer, Brooks Arcade, Salt Lake City, Utah.

Idaho district, covering only the State of Idaho. G. Clyde Baldwin, district engineer, Idaho Building, Boise, Idaho.

Columbia River district: Oregon and Washington. F. F. Henshaw, district engineer, Tilford Building, Portland, Oreg.

California district: California, Nevada, and Arizona. H. D. McGlashan, district engineer, Custom House, San Francisco, Cal.

Texas district, covering only the State of Texas. T. U. Taylor, district engineer, Austin, Tex.

Hawaiian district, covering the Territory of Hawaii. W. F. Martin, district engineer, Honolulu, Hawaii.

Alaskan district, covering the Territory of Alaska. C. E. Ellsworth, engineer in charge.

The results of the work performed in the several districts are analyzed in the respective district offices and are then transmitted to the Washington office, where they are reviewed and prepared for publication in the computing section, which is under the charge of R. H. Bolster, hydraulic engineer. The work of the computing section is important, as its examinations insure that the data are on a high standard and that they are presented in a uniform manner. This division also carried on special hydrologic studies, the results of which are published in special water-supply papers.

GAGING STATIONS AND COOPERATING PARTIES.

For making measurements of stream flow regular points of measurement, known as gaging stations, are established on the various streams. At these points sufficient data are collected for determining the daily flow. The distribution of the gaging stations by States is shown in the accompanying table, together with the number of stations established and discontinued. As a large part of the work is carried on in cooperation with other Federal bureaus, State organizations, and private parties, the table has been arranged to show the extent of such cooperation in each State. During the year 99 stations were discontinued and 278 stations established. At the end of the year the total number of stations maintained, exclusive of those in Alaska and Hawaii, was 1,232. In addition to the foregoing, records ready for publication for about 186 stations were received at the end of the year from private parties.

Gaging stations maintained by United States Geological Survey and cooperating parties at end of fiscal year 1911.

State.	Geological Survey alone.	Reclamation Service.	Forest Service.	Indian Office.	Army Engineers.	Weather Bureau.	Other Federal bureaus.	State cooperation.	Municipal cooperation.	Private parties.	Counted more than once.	Maintained May 31, 1911.	Established during year.	Discontinued during year.	Regular gaging.	Miscellaneous gaging.
Alabama.....					1	2		6				9	1		13	
Arizona.....	6	2							1	2		11	2	1	176	4
California.....		7	62	1		2	5	94	10	13	1	193	77	4	929	287
Colorado.....		4	61					18		7		91	9	11	867	36
Connecticut.....						1						1		1		
Georgia.....	1					9				8		18	1		43	6
Idaho.....		6	20	5		1		82	1	46	42	119	45	1	527	81
Illinois.....						1		22				23		1	53	
Indiana.....						1						1			2	
Iowa.....								4		1		5	4		5	
Kentucky.....														3		7
Maine.....							1	17		3	3	18			177	
Maryland.....	2											2			1	
Massachusetts.....								7		4	2	9		1	22	
Michigan.....								1	1	5		7				
Minnesota.....	1					2		47			2	46	3	3	293	34
Mississippi.....						1		4				6		3	25	
Montana.....	51	50	18	7		1				4		131	19	7	480	26
Nebraska.....								10				10				
Nevada.....	2	3				1	3	4				13	3		37	
New Hampshire.....							9					9			355	
New Jersey.....	1					2						3				
New Mexico.....		3	13	2				17		3		37	14	10	91	33
New York.....					1	3		28	2	3	6	41	4		227	8
North Carolina.....	1					2				6	1	8	2		20	2
North Dakota.....	7											7	1	2	61	1
Ohio.....	1									1		2			4	3
Oregon.....	4	1	13	8	1	3		40	4	56	3	127	22	21	363	58
Rhode Island.....								1		1	1	1			3	
South Carolina.....						1						1				
South Dakota.....		1		3								4	4		21	
Tennessee.....	3					6		1				10			19	
Texas.....	1					8						9	5		7	
Utah.....	1		3			1		57	7	32	32	62	29	4	247	31
Vermont.....								10		7	6	11	3		21	
Virginia.....	10					1				2		13			14	2
Washington.....			11	12		2	3	28	2	27		85	15	8	507	140
West Virginia.....	20									1		21			40	9
Wisconsin.....				2						5		61		1	3	
Wyoming.....		4	12					42			2	61	15	6	208	14
	112	81	213	40	8	52	21	550	28	242	108	1,232	278	99	5,860	788

Records for 186 stations are obtained and furnished complete by outside parties.

During the past year special attention has been given to improvement in the accuracy of the results obtained. In this connection much new equipment has been installed, including many automatic gages for obtaining a continuous record of stage, which is necessary to determine accurately the daily flow of streams that have much diurnal fluctuation in stage. The methods in use in the Washington office and in the district offices were thoroughly reviewed, and standard methods of procedure in all lines of work were installed in all the offices, thereby increasing the efficiency and also raising the standard of the results.

In Alaska investigations were carried on in the Fortymile, Circle, and Fairbanks regions.

Sufficient data were collected in connection with the investigations in the Territory of Hawaii for publication in a report, which is now being prepared.

PUBLICATIONS.

To facilitate the use of Government reports relating to water supply, climate, and related subjects the United States has, by agreement between the Geological Survey and the Weather Bureau, been divided into 12 areas, and the progress report of stream gaging has been divided into 12 parts, each part covering one of these areas. The areas and the number of the corresponding reports giving the results for 1909, 1910, and 1911 are shown in the table below. The reports for 1911 have not yet been published.

Reports on surface-water supply of the United States.

[The numbers given are the serial numbers of the water-supply papers.]

	1909	1910	1911
North Atlantic coast.....	261	261	301
South Atlantic coast and eastern Gulf of Mexico.....	262	262	302
Ohio River basin.....	263	263	303
St. Lawrence River basin.....	264	264	304
Upper Mississippi River and Hudson Bay basins.....	265	265	305
Missouri River basin.....	266	266	306
Lower Mississippi River basin.....	267	267	307
Western Gulf of Mexico.....	268	268	308
Colorado River basin.....	269	269	309
Great Basin.....	270	270	310
California.....	271	261	311
North Pacific coast.....	272	262	312

RIVER-PROFILE SURVEYS.

During the year all river-profile surveys were performed by the topographic branch, except certain incidental surveying in the upper Mississippi district by W. G. Hoyt on Zumbro, Little Fork, Big Fork, Wild Rice, Prairie, and Kawishiwi rivers and on certain rivers draining into Lake Superior.

DIVISION OF GROUND WATERS.

The allotment for the work of the division of ground waters was \$17,630. Of this amount, \$12,570 was used for investigations of ground-water problems and \$5,060 for investigations of the quality of water, including both surface and underground supplies.

An investigation of the underground water resources of the State of Connecticut was undertaken at the beginning of the fiscal year in cooperation with the State Geological and Natural History Survey. This investigation, which is to be extended over a period of two or more years, is under the supervision of Prof. H. E. Gregory, of Yale University and of the Survey staff, and the field work is conducted by A. J. Ellis, of the Geological Survey. It is one of the most detailed studies of ground water that has been undertaken in any of the Eastern States, and it will furnish the basis for a reliable estimate of the quantity of ground water available to the rapidly developing industrial communities of Connecticut.

A comprehensive report on the underground water of Iowa, which has been for some time in preparation in cooperation with the State Survey, was received in rough draft late in the previous fiscal year, has been advanced through the various stages of editorial revision, and is now in the hands of the Public Printer. This report (Water-Supply Paper 293) has been prepared under the supervision of Prof. W. H. Norton, of Cornell College, Mount Vernon, Iowa, and will be published as a joint product of the Federal and State surveys.

A report by Prof. C. H. Gordon, of the University of Tennessee, Knoxville, Tenn., on the geology and underground waters of north-eastern Texas, was issued during the present fiscal year as Water-Supply Paper 276, and a similar report by the same author on the geology and underground waters of the Wichita region of north-central Texas (Water-Supply Paper 317) is now in the hands of the editor.

During the last few years the Geological Survey has made a series of investigations of the underground water resources and irrigation possibilities of the western half of Utah, in which numerous shallow-water tracts exist. The results of these investigations have been published in several water-supply papers, the report by O. E. Meinzer on the ground waters in Juab, Millard, and Iron counties having been issued during the present fiscal year as Water-Supply Paper 277. In July, 1911, the examination of Boxelder County, a part of Tooele County, and certain small areas in southern Idaho was undertaken by Everett Carpenter, junior geologist, and at the close of the fiscal year the report is well advanced.

Urgent requests have in recent years been made of the Survey for information as to the occurrence of underground supplies in various parts of New Mexico and the feasibility of utilizing such supplies for irrigation. To these requests the Survey has responded so far as was possible. During the present fiscal year a report by O. E. Meinzer on the geology and water resources of Estancia Valley and adjacent areas was issued as Water-Supply Paper 275, the field investigation of the area about Deming was practically completed, and a survey of the Tularosa Basin and some of the plateaus of central New Mexico was begun. The Deming investigation, which was begun in the previous year, has been conducted by N. H. Darton, geologist, whose report is now in preparation. The Tularosa survey is being made in cooperation with the New Mexico Agricultural Experiment Station, O. E. Meinzer being in charge of the work done by the Federal Survey and Dr. R. F. Hare, chief chemist of the Experiment Station, being in charge of the analytical work done by the State. The report that is being prepared will cover all important phases of the underground-water problems of the region but will be devoted especially to the problems of irrigation with ground water in the Tularosa Basin and of the development of supplies for range stock on the plateaus.

It will also contain a guide to desert watering places in a part of New Mexico.

The report on the geology and water resources of Sulphur Springs Valley, Ariz., produced in collaboration by O. E. Meinzer, of the Federal Survey, and R. H. Forbes and F. C. Kelton, of the State Experiment Station, has been completed during the present fiscal year. It will be issued both as a water-supply paper of the Survey and as a bulletin of the Arizona Experiment Station.

The special investigations which during the preceding two years were conducted for the Office of Indian Affairs in the Moki and Navajo reservations in Arizona and adjacent parts of New Mexico and Utah were continued during the present year by H. E. Gregory, who has from the beginning been in charge of the work. The results of these studies are not prepared for publication but are presented in the form of manuscript reports to the Commissioner of Indian Affairs and serve as guides to the agents and engineers of the Indian Office.

By direction of Assistant Secretary Thompson, W. C. Mendenhall was instructed on August 3, 1911, to visit the Mesa Verde National Park, in order to examine the water supplies developed and available there for the use of the park officials and tourists and to suggest, should there prove to be need of additional supplies, methods for their development. The examination was made in the early part of September, 1911, and a report embodying its results has been prepared.

Reports embodying the results of four independent underground water investigations in California are in process of preparation or publication. Extensive field investigations of the occurrence, quality, and recovery of the underground supplies of the great area known as the San Joaquin Valley were made previous to this fiscal year by W. C. Mendenhall, geologist in charge of underground-water investigations, R. B. Dole, and Herman Stabler. During the year 1911-12 the data thus acquired have been reduced in the office, and a report for publication has been written in part. A similar report on the San Jacinto Valley is in preparation. On account of the importance of the underground supplies for irrigation the results of these two investigations will be of exceptional value.

The report by G. A. Waring on California springs and the report by C. H. Lee on an intensive study of the water resources of a part of Owens Valley, Cal. (Water-Supply Paper 294), have both been completed during the present year and will be published in the near future. The researches in Owens Valley were made possible through the cooperation of the city of Los Angeles. The results obtained will be a valuable contribution to the knowledge of the laws governing the circulation and disposal of underground waters.

A special investigation of the effects of steps taken by certain southern California communities during recent years to measure the

absorption of flood waters and thereby add to the ground-water supplies has recently been undertaken by Mr. Lee, through cooperation with the California State Conservation Commission. This research will be continued during the year 1912-13.

The underground-water investigations on the Atlantic and Gulf Coastal Plain are conducted by the geologic branch in connection with other geologic work and are described elsewhere in this report.

Investigations of the quality of water were continued under the immediate direction of R. B. Dole, chemist. He devoted the first ten months of the year to the preparation of a report on the quality of surface waters of the United States and of sections of other reports of the Survey as follows: "The concentration of mineral water in relation to therapeutic activity," for the chapter of "Mineral resources" on the production of mineral waters in 1911; and chapters on the quality of underground waters for reports on the underground-water resources of Texas, Florida, Georgia, Mississippi, and California. During May and June Mr. Dole was transferred to the geologic branch for the purpose of making a field examination of potash deposits in the southwestern part of Nevada. He also retained supervision over the work of Walton Van Winkle, assistant chemist, in Oregon.

Walton Van Winkle was engaged in an investigation of the quality of surface waters in Oregon and their availability for use for household, agricultural, and manufacturing purposes. This work was maintained in cooperation with the State of Oregon, through the office of John H. Lewis, State engineer, and consisted of the analysis of samples of water taken daily at the regularly established sampling stations on the important streams of the State. The laboratory work was performed in suitable quarters gratuitously furnished by the Willamette University at Salem, Oreg.

DIVISION OF WATER UTILIZATION.

ORGANIZATION.

The work of the division of water utilization has been maintained under the general plan of organization described in the last annual report. E. C. LaRue and E. C. Murphy, engineers, have performed the greater portion of the field work involved in the examination of water-power withdrawals, rights of way, Carey Act segregations, and enlarged-homestead designations and the examination of lands for similar purposes within Indian reservations. The chief hydrographer has expended such portion of his time as could be spared from other duties in similar field work. The personnel of this division and the appropriation available for its work are entirely insufficient to meet suitably the demands made upon it. A discussion of the scope of the work and its condition on January 1, 1912, so far as

the field investigations are concerned, is contained in the following paragraphs.

CLASSIFICATION OF PUBLIC LANDS.

The enlarged-homestead acts of February 19, 1909, and June 17, 1910, and the withdrawal act of June 25, 1910, involve extensive field investigations and reports by the Geological Survey. Contemporaneous with these duties came the Secretary's policy of referring to the Survey for report applications for rights of way and for Carey Act segregations. This policy requires work nearly if not quite as extensive as that imposed by the two acts above referred to. In these ways there were thrown on the water-resources branch field duties which, if suitably performed, would more than double the work that was being previously done. Nevertheless an increase of \$50,000 only has been granted to meet this new condition. It should be emphasized that all the Land Office work involving the determination of the suitability of lands for water power and irrigation falls upon this appropriation. In consequence of the lack of funds the work is far behind schedule, and that which has been done has not been performed as well as it should have been. It involves the establishment and maintenance of stream-flow stations as well as engineering investigations of a high character. The enlarged-homestead act, for example, places upon the Survey the determination of the practicable irrigability of land proposed for designation under the terms of the act. To determine this matter properly months of investigation are sometimes necessary. Private companies and the Reclamation Service have spent large sums of money to determine the irrigability of a single tract. The Reclamation Service has found it necessary to expend \$217,000 for the purpose of ascertaining that five irrigation projects, covering 480,000 acres, were not feasible. Under the present conditions the Survey must make such determination on mere inspection, and there is danger that grievous errors may be made. Below is a statement of the status of the public-land classification work, so far as it relates to water utilization. It will be seen that at the present rate of progress the work as a whole is at least two years, and possibly three years, behind, which means that unless any recent application is taken up out of its regular order it can not be finally acted upon by the department inside of three years.

Enlarged-homestead designations in fiscal year 1912.

Designated during the year.....	acres..	1,700,000
After field examination.....	do....	613,000
From office data	do....	857,000
From general information.....	do....	230,000
Petitions now pending.....		200
Area represented.....	acres..	2,000,000

As the boundaries of the designated areas are extended and refined the requests for examination and designation refer to smaller and more scattered areas, and the difficulty and expense of making the necessary investigations proportionately increase. Many of the tracts adjoin irrigable areas, and the determination of the character of the lands with respect to future irrigation requires much more careful investigation than was necessary in the earlier cases.

It is estimated that the examination of the area now on application, comprising about 80 townships, will require the work of two engineers for an entire field season. The office work of preparing the results for action and the making of proper records will require the entire time of one clerk, in addition to technical supervision.

Right-of-way applications.

Pending in Survey January 1, 1911.....	239
Received from General Land Office.....	834
Reported on during 1911.....	861
From office data.....	791
From field examination.....	90
Applications pending in field.....	89

These figures indicate that a little over 10 per cent of the applications received have been given special field examination. The other 90 per cent were reported upon from office information obtained from reports upon previous applications, from investigations of water-power withdrawals, or from topographic and water-supply data on file. Although the land-classification board might properly call for a field examination on many of these applications, such examination has not been requested, because of the knowledge that only a small number of applications could be promptly examined in the field. Action has thus been taken on meager data in many cases where it is probable that field investigation should have been made.

The number of applications pending report from the field at the close of the calendar year does not represent the accumulation of work of this character at the present time. It is believed that important data would be procured on over 50 per cent of the 212 applications pending on January 1, 1912, if field examination were possible. The 89 applications pending report from the field thus by no means represent the amount of field work which should be done during the coming field season.

About 150 right-of-way applications now pending require field investigations. They represent fully a year's work for four men. About one-half the time of two men is now employed, and no more can be assigned without a larger appropriation. At this rate the applications now pending can not all be acted on for at least four years.

Water-power withdrawals.

	Acres.
Withdrawn and requiring examination Jan. 1, 1911-----	1, 149, 618
Examined during 1911-----	398, 330
Remaining unexamined-----	751, 288
New withdrawals during 1911-----	358, 445
Of which there must be examined-----	223, 939
Grand total awaiting examination-----	975, 227

This work will require at the present rate of progress two and one-half years to complete.

CAREY ACT SEGREGATION LISTS.

The reclamation of public lands by the States under the terms of the Carey Act and its amendments requires investigation by the Geological Survey to determine the sufficiency of the water supply and the feasibility of the plan of reclamation. There are ordinarily three stages in the development of a project—first, the temporary blanket withdrawal for one year of an area believed to include all the lands that will eventually be segregated for the project, in order that the State may work out a detailed plan of irrigation; second, the segregation of the irrigable lands for a period of 10 years in order that the irrigation works may be constructed and the lands reclaimed and settled; and third, the application of the States for patent, the lands having been reclaimed in accordance with the contract entered into at the time of segregation.

During the period of temporary withdrawal it is occasionally desirable that the project be examined in a general way in order to determine what steps are being taken to procure data by which to estimate the water supply available for the project. The necessity for field investigation arises, however, in most projects, in connection with the segregation of the lands. Here the determination of the acreage which the project may properly include requires a careful study of the water supply, water rights, and duty of water. In some projects where accurate stream measurements and records of appropriation are available, field investigation for this purpose is not essential, but where it is proposed to utilize sources of water supply which have not been accurately measured, or where the water rights are chaotic, examination on the ground is essential to the protection of the prospective settlers. Lastly, there must be an examination of the constructed project and a determination of the compliance of the State with the terms of its contract.

A necessity for field investigation arises also when a segregation becomes inactive because of the failure or suspension of the proposing company. In such cases the hardship falls upon the settlers, and the protection of their rights and those of the United States becomes a matter of the highest consequence.

During the calendar year 1911 the Geological Survey reported on the sufficiency of the water supply of 38 proposed segregations, the office work requiring the greater part of the time of an experienced engineer. In addition, field engineers were from time to time detailed to investigate particular projects, and more such investigations would have been requested if it had not been known that great delays in the handling of the cases would have resulted. Since the consideration of the Carey Act lists has been made "special," by order of the Secretary, the land-classification board has found it necessary to act from office information in every case where the information was not so meager as to make such action entirely impossible.

ACQUISITION OF LANDS FOR NATIONAL FORESTS.

The investigations of precipitation and run-off, begun near the close of the fiscal year 1911 in the White Mountain region of New Hampshire, have been continued throughout the year, and a preliminary report favorable to the purchase of lands in that region under the terms of the Weeks Act was rendered about June 1. Reference to that report is made elsewhere (pp. 18-19). These investigations were the most intensive that have ever been performed by the Geological Survey and it is doubtful if the features of the run-off of any stream have ever been studied with so much detail as were those that were selected for study in the White Mountain region. The work involved a refined determination of precipitation, in the form of both rain and snow, by the establishment and close observation of numerous gages set on the drainage areas at all different points of elevation and exposure. The studies of run-off were made by the careful establishment and equipment of gaging stations on the several streams and the correction of the channel at those stations in order that extreme refinement might be secured in the measurements of flow. All stations thus established were equipped with automatic recording gages, so that it has been possible to determine the volume of water passing the stations at any moment of the day. The prosecution of the work has made necessary the employment of a corps of engineers numbering at different times from four to eight and of an equal number of observers, whose duties were to make frequent records of precipitation as measured by the numerous gages.

PUBLICATION BRANCH.

BOOK-PUBLICATION DIVISION.

SECTION OF TEXTS.

The publications of the year consisted of 1 annual report, 1 monograph, 4 professional papers, 48 bulletins, 34 separate chapters from 5 bulletins, 21 water-supply papers, 2 annual reports on mineral resources (one published also in 54 separate chapters, all delivered in 1910-11, and the other in 51 separate chapters, 7 delivered in 1910-11 and 44 in 1911-12), 20 advance chapters from the annual report on mineral resources for 1911, 6 geologic folios, 2 lists of publications, 57 press bulletins, 12 monthly lists of new publications, one pamphlet entitled "Instructions to topographers of the United States Geological Survey," charts showing mineral and clay products and the production of coal in the United States to the close of 1910, and a circular concerning geologic folios. These publications were the Thirty-second Annual Report; Monograph LII; Professional Papers 69, 70, 73, and 75; Bulletins 448, 450, 451, 454 to 456 inclusive, 458, 464, 466 to 470 (published also in 11 advance chapters, 7 delivered in 1910-11 and 4 in 1911-12) inclusive, 4 advance chapters from 471, 472 to 479 inclusive, 480 (published also in 10 separate chapters), 481 to 497 inclusive, 499, 500, 504 to 507 inclusive, 509, 511, 512, 3 advance chapters from 520, and 13 advance chapters from 530; Water-Supply Papers 261, 266 to 269 inclusive, 271 to 280 inclusive, 282, 285 to 288 inclusive, and 295; Mineral Resources for 1909 (volume), Mineral Resources for 1910 (volume and 44 separates), and 20 advance chapters from Mineral Resources for 1911; Geologic Folios 178 to 183 inclusive; Lists of Publications, New Series Nos. 1 and 2; Press Bulletins 8 to 62, inclusive (also 2 special issues); and Monthly Lists of New Publications Nos. 44 to 55 inclusive. Titles and summaries of the publications of the regular series are given on pages 23-38.

The total number of printed pages in these publications was 17,846. The publications of the previous year comprised 13,566 pages.

During the year 48,210 pages of manuscript were edited and prepared for printing, and proof sheets for 15,677 final printed pages were read and corrected, this work involving the handling of 5,648 galley proofs and 30,513 page proofs. The corresponding figures for 1910-11 were 40,648 pages of manuscript, 17,417 final printed pages, 5,787 galley proofs, and 32,706 page proofs. Indexes were prepared for 49 publications, covering 10,571 pages; the figures for the previous year were 74 publications and 14,400 pages.

At the close of the fiscal year seven persons were employed in this section. The water-resources branch has continued to render special assistance in copy preparing and proof reading.

SECTION OF ILLUSTRATIONS.

The personnel of the section of illustrations consisted of 10 draftsmen (including the draftsman in charge), 1 assistant map printer, and 1 draftsman-clerk.

During the year 5,006 illustrations were prepared and most of them were transmitted, to accompany 26 bulletins, 11 water-supply papers, 2 professional papers, 1 annual report, and 1 report on mineral resources. These illustrations included 251 maps, 1,679 diagrams, 2,237 paleontologic drawings, 9 landscape drawings, 504 photographs retouched, and 326 miscellaneous pieces.

The section received and compared critically 1,331 proofs, as well as all contract-printed illustrations delivered at the Government Printing Office.

The number of electrotypes furnished to outside applicants was 144.

At the close of the year material for the illustration of 28 reports was on hand, 23 being from 10 to 90 per cent completed.

SECTION OF MAP EDITING.

GEOLOGIC MAPS.

The geologic map of North America was completed and issued during the year. Six folios (Nos. 178 to 183, inclusive), which are listed on page 37, were published. The Apishapa (Colo.), Kenova (W. Va.-Ky.-Ohio), Murphysboro-Herrin (Ill.), and Raritan (N. J.) folios were completed with the exception of the descriptive text. The Barnesboro-Patton (Pa.), Ellijay (Ga.-N. C.-Tenn.), Philipsburg (Mont.), and Tallula-Springfield (Ill.) folios were well advanced in publication, and the Belleville-Breese (Ill.), Colorado Springs (Colo.), Eureka Springs-Harrison (Ark.), and San Francisco (Cal.) folios were begun.

The Castle Rock (Colo.), Berea-Cleveland (Ohio), Columbus (Ohio), Eastport (Me.), Minneapolis-St. Paul (Minn.), Niagara (N. Y.), and Silver City (N. Mex.) folios were awaiting editing at the close of the year.

The list of folios in course of publication and in preparation for publication, arranged in order of progress, is as follows:

Kenova, W. Va.-Ky.-Ohio (No. 184).
 Murphysboro-Herrin, Ill. (No. 185).
 Apishapa, Colo. (No. 186).
 Raritan, N. J.
 Philipsburg, Mont.
 Ellijay, Ga.-N. C.-Tenn.
 Barnesboro-Patton, Pa.
 Tallula-Springfield, Ill.
 San Francisco, Cal.

Colorado Springs, Colo.
 Eureka Springs-Harrison, Ark.
 Silver City, N. Mex.
 Columbus, Ohio.
 Eastport, Me.
 Castle Rock, Colo.
 Berea-Cleveland, Ohio.
 Niagara, N. Y.
 Minneapolis-St. Paul, Minn.

Three persons are employed in this subsection. A fourth man was employed during the early part of the year.

TOPOGRAPHIC MAPS.

At the beginning of the year 151 atlas sheets and special maps were on hand for publication. The accessions during the year were 119. The separate map publications during the year numbered 114, of which 90 were new engraved sheets, 14 revised sheets (of which 5 were reengraved), and 10 photolithographs. Sixty-five maps were in process of publication and 102 new maps were on hand awaiting action at the end of the year. The following statement shows the status of map editing June 30, 1912:

Status of work on engraved maps June 30, 1911, and June 30, 1912.

	1912	1911
Published during the year.....	114	86
In process of engraving.....	65	56
Not taken up.....	102	96

The manuscripts edited during the year comprise 103 topographic atlas sheets and other maps prepared for engraving; 10 State maps on scale of 1:500,000 and two large-scale contour maps, prepared for photolithography; corrections for 148 maps hitherto published; 13 maps published under contract; and 240 maps for illustration of 34 Geological Survey reports. The proof read comprises 96 new topographic maps, corrections to 83 old ones, and 23 maps published under contract. All but two of the 21 index circulars of the series 9-323 were revised and reprinted during the year, and an index map showing progress of topographic surveys in the State of Kentucky was prepared and printed for the State geologist.

Five men were employed in the work of this subsection during the whole year and two others during the second half of the year.

SECTION OF DISTRIBUTION.

The section of distribution received during the year 175 new books, 36 reprinted books, 6 folios, 42 geologic maps, 90 new topographic maps, 14 revised maps, 10 photolithographs, and 166 reprints of maps, a total of 539 publications. The total of all editions received was 437,501 books, 30,127 geologic folios, and 982,412 maps, a grand total of 1,450,040.

Reprints of the following publications were delivered to the Survey during the fiscal year 1912: Bulletins 452, 467, 470-B, 479, 480, 530-A, 530-B, 511; Water-Supply Papers 170, 172, 173, 174, 200, 201, 202, 203, 204, 206, 207, 208, 209, 210, 211, 213, 214, 219, 231, 232, 247, 248, 249, 255, 257, and 273; one advance chapter from Mineral Resources for 1911, namely, "The production of antimony, arsenic, bismuth, and selenium in 1911;" and Professional Paper 73.

There were distributed 437,637 books, 30,743 folios, 658,240 maps (including 529,656 sold), a total of 1,126,620.

The total amount received and turned into the Treasury as the result of sales of publications was \$25,755.22, of which \$21,356.27 was the proceeds of sales of topographic and geologic maps, an increase of \$4,171.67 over the amount received in the fiscal year 1911.

Fifteen persons were employed in this section during the year.

DIVISION OF ENGRAVING AND PRINTING.

MAPS, FOLIOS, AND ILLUSTRATIONS.

During the fiscal year 114 topographic atlas sheets, with a total printing of 917,572 copies, and 2 special maps were published, and at the end of the year 65 sheets were in various stages of progress toward publication. The number of sheets published is 25 in excess of the number published in 1911.

Corrections were engraved on the plates of 163 maps hitherto published. Editions of 268 maps, including new sheets and reprints, were printed and delivered to the map room, an increase of 37 over the figure for 1911.

Six geologic folios were published, three of them in two forms, and 30,127 copies of eight different folios were printed and delivered, an increase of 9,237 copies over the figures for 1911. Eleven geologic folios were in various stages of progress toward publication.

Under contracts with the Government Printing Office awarded on competitive bids, illustrations were printed for the following Survey publications: Bulletins 448, 452, 467, 470-B, 471-B, 471-E, 478, 483, 485, 498, 500; Professional Papers 71, 73, 74, 75, 78; Water-Supply Papers 231, 277, 279; Mineral Resources—Production of coal in 1910, Production of cement in 1911, Production of salt and bromine in 1910.

For the Government Printing Office also the following items were printed and delivered: Illustrations for the Annual Report of the Governor of Arizona; Annual Report of the Governor of Alaska; Annual Report of the Superintendent of Crater Lake National Park; Annual Report of the Chief of Engineers, United States Army; Annual Report of the Chief Signal Officer, United States Army; Annual Report of the War Department, vol. 1; Annual Report of the Superintendent of Glacier National Park; Annual Report of the Governor of Hawaii; Annual Report of the Governor of New Mexico; Annual Report of the Superintendent of Sequoia and General Grant National Parks; Annual Report of the Superintendent of Yosemite National Park; Annual Report of the Commissioner of Indian Affairs; Annual Report of the Superintendent of the Coast and Geodetic Survey; Report of the Commissioner of Corporations on the Lumber Industry, Part I; Report of the Commissioner of Corporations on Transportation by Water in the United States, Part III

(Water Terminals); Report of the Commissioner of Corporations on Water-Power Conditions in the United States, Parts I and II; Report on the Platt and Wind Cave National Parks, Sullys Hill Park National Monuments, and Bird Reservations; Twenty-third Statistical Report on Railways in 1910; twenty Senate and House Documents; Special Publications Nos. 9 and 10 of the Coast Survey; Bulletin 36 of the Bureau of Mines; Bulletin 101 of the Bureau of Ethnology; Bulletin 222 of the Office of Experiment Stations; Bulletin of the Bureau of Fisheries, vol. 31 (1911); Catalogue of Charts and Plans, United States Atlantic Station; Population Bulletin of the United States. In addition to the above, the following separate illustrations were printed and delivered to the Government Printing Office: Ringlemann's Scale for Grading Density of Smoke; Stadia Diagram No. 1; Stadia Diagram No. 2; Diagram of Zone Tariff for Proposed Parcels Post; Hearings No. 30, White Earth Reservation; Survey of Oyster Bars in St. Marys County, Maryland; The Omaha Indians vs. the United States; Map of North America; Map of Peat Deposits; and Mineral Plat.

The following work was done for other Government departments and bureaus: For the Forest Service, maps of 63 national forests, 39 proclamation diagrams of national forests, map of North America (western half), map showing production of lumber by States and kinds, map of South America showing natural forest regions, index map of national forests, statistical diagram, stadia rod patterns, scales, and diagram of lookout station protractor; for the General Land Office, 1,189 township plats, 681 mineral plats, maps of Cœur d'Alene and Rosebud Indian reservations, and other miscellaneous work; for the Department of the Interior, maps of three national parks, two national monuments, seven bird reservations, and Hot Springs Reservation; for the Reclamation Service, a large amount of miscellaneous work; for the Office of Indian Affairs, 11 township plats and maps of 9 Indian reservations. Work was also done for the Interstate Commerce Commission, Civil Service Commission, War Department, United States Military Academy, Bureau of Mines, Bureau of Standards, Department of Agriculture, Weather Bureau, Smithsonian Institution, Department of Justice, Bureau of Insular Affairs, United States and Canada Boundary Survey, Biological Survey, House of Representatives, Army Service Schools, Army War College, Alaska Boundary Survey, and Post Office Department. This work for other branches of the Government amounted to about \$40,000, for which the division was reimbursed by transfer of credit on the books of the United States Treasury.

Of contract and miscellaneous printing of all kinds, the total number of copies delivered was 2,150,859, which required 5,695,629

printings. The total number of copies printed, including topographic maps and geologic folios, was 3,129,308, requiring 10,744,192 impressions. On requisition of the Government Printing Office, 383 transfer impressions were made and shipped to contracting printers.

INSTRUMENT SHOP.

The work of the instrument shop consisted of repairing surveying, drafting, engraving, stream-gaging, and other instruments and making copper plates and electrotypes. More than 2,000 repairs and overhauls were made, 104,421 square inches of new copper plates were made and 4,641 square inches were resurfaced, and 10,712 square inches of electrotypes were made.

PHOTOGRAPHIC LABORATORY.

The output of the photographic laboratory included 14,972 negatives, of which 11,356 were dry, 3,078 were wet, and 538 were paper, and 39,128 prints, of which 13,020 were maps and diagrams and 26,108 were photographs for illustrations.

ADMINISTRATIVE BRANCH.

EXECUTIVE DIVISION.

The work in the executive division was of the same scope as in other years, except for the transfer to it of the carpenter shop and the transfer from it to the section of distribution of the handling of local map sales—that is, sales to those who call in person to purchase maps.

Mails, files, and records.—During the year 411,847 pieces of incoming mail were handled in this division, of which 269,988 were distributed unopened to the various branches, divisions, and sections of the Survey and to individuals and 141,859 were opened and referred. The latter figure represents an increase of 5.56 per cent over that for the fiscal year 1911. No comparison can be made of the amount of mail distributed unopened during the years 1911 and 1912, as the record for last year covers only four months. Of the mail received, 2,664 pieces were registered, which is an increase over the preceding year of nearly 3 per cent.

Of the letters opened in this division 28,199 contained remittances for Survey publications, amounting to \$26,909.31.

Practically the entire services of four clerks and about half the time of a fifth were required in recording, referring, and filing correspondence.

In December, 1911, a new method of handling outgoing mail for the entire Survey was adopted. Previous to that time boxes were located in various parts of the building, in which mail of all classes was deposited. This mail was collected and bagged by the wagon

driver. Under the new method these boxes have been discontinued, all mail, except large sendings of publications, being deposited in appropriate drops in a central mail room and there counted and bagged. This prevents mistakes in placing mail of different classes in the same bag and permits a record of the number of outgoing pieces of various classes. As this new plan has been in operation only a little over six months, it is impossible to give figures for the year.

As formerly, letters prepared in the various branches, divisions, and sections for the signature of the Secretary, the Director, and the chief clerk have been inclosed in envelopes and mailed by the executive division. The number of such letters mailed during the year was 83,184, an increase of nearly 17 per cent over last year. The number of pieces of outgoing registered mail was 18,097, a decrease of about 13 per cent.

With a view to devising and installing an improved system for the general files, the Survey employed, in December, 1911, an additional file clerk, who, during the last half of the fiscal year, was engaged in familiarizing himself with the method of filing already in use, examining filing systems in a number of other Government bureaus, and preparing, after a decision had been reached to adopt it, a subject classification in accordance with the Dewey system. This classification was completed at the close of the fiscal year in time to put it into operation on July 1, 1912.

A plan providing for a personnel file, to consist of separate folders for each member of the Survey holding a Secretary's appointment, containing correspondence and other papers relating to his appointment status and personnel record, was put into effect during the last half of the year. This file has been exceedingly useful.

Personnel.—The roll of those holding Secretary's appointments numbered at the close of the fiscal year 880 persons, compared with 862 at the close of the fiscal year 1911. The total number of changes in the personnel for the year was 765, which included original appointments, separations, promotions, extensions, and changes of status of every description. Of these, 177 were new appointments, 159 were separations, 383 were promotions, and 2 were reductions.

During the year 14,069 days of annual leave and 2,921 days of sick leave were granted, being about 67 per cent of the amount of annual leave and 14 per cent of the amount of sick leave which it is permissible to grant under the law; also 4,423 days of leave without pay. In addition to the above, the transfers to State pay rolls in cooperative work amounted to 3,392 days of service.

Property.—An inventory of nonexpendable property in Washington was submitted to the department at the close of the calendar year 1911.

Express and freight.—During the year 4,013 pieces of freight and express were handled, of which 1,155 were outgoing and 2,858 were incoming. There were 541 transportation accounts checked, an increase of about 20 per cent.

Purchase of supplies.—The purchase of supplies, which includes the work of procuring bids, issuing orders, and preparing vouchers covering all purchases made directly by the Survey in Washington, required the services of two persons. The number of requisitions handled was 2,010, a decrease of about 7 per cent. The number of orders drawn, however, was 1,775, a decrease of but 1 per cent.

Stationery, printing, and miscellaneous supplies.—There were 7,355 requisitions filled from stock in the stationery room. The requisitions drawn on the department numbered 319 for miscellaneous supplies, 167 for stationery, and 439 for printing. These figures show an increase of nearly 3 per cent over 1911 in the number of requisitions filled from stock. The decrease in the number of requisitions for stationery and for miscellaneous supplies drawn on the department, slightly over 9 and 3 per cent, respectively, is due to the fact that larger quantities are ordered at one time. In the number of requisitions for printing there was an increase over the previous year of about 2 per cent.

DIVISION OF DISBURSEMENTS AND ACCOUNTS.

A condensed statement covering the financial transactions of the fiscal year is given below:

Amounts appropriated for and expended by the United States Geological Survey pertaining to the fiscal year ended June 30, 1912.

Title of appropriation.	Appropriation.	Repayments.	Available.	Disbursements.	Balance.
Salaries, office of the Director	\$35,340	-----	\$35,340.00	\$35,271.96	\$68.02
Salaries, scientific assistants	29,900	-----	29,900.00	29,899.92	.08
Skilled laborers, etc	20,000	-----	20,000.00	19,999.85	.13
Topographic surveys	350,000	\$3,134.29	353,134.29	350,050.46	3,083.86
Geologic surveys	300,000	56,493.63	356,493.63	349,846.47	6,647.17
Mineral resources of Alaska	100,000	19.50	100,019.50	96,718.13	3,301.32
Chemical and physical researches	40,000	335.35	40,335.35	37,572.23	2,763.14
Preparation of illustrations	18,280	-----	18,280.00	18,217.66	62.30
Mineral resources of the United States	75,000	13.36	75,013.36	74,133.06	880.33
Gaging streams, etc	150,000	20,986.34	170,986.34	166,465.71	4,520.64
Books for the library	2,000	-----	2,000.00	1,025.76	974.23
Geologic maps of the United States	110,000	71,884.34	181,884.34	150,525.61	31,358.78
Surveying national forests	75,000	2,838.90	77,838.90	77,121.72	717.15
	1,306,520	155,705.71	1,461,225.71	1,406,848.56	54,377.15

The following table gives the classified net expenditures by the Survey for the fiscal year, the repayments shown in the preceding table having been deducted:

Classification of expenditures by the United States Geological Survey pertaining to the fiscal year ended June 30, 1912.

Appropriation.	Total.	Salaries and wages.	Transportation of persons.	Transportation of things.	Subsistence and support of persons.	Subsistence and care of animals, etc.	Communication service.	Printing, engraving, lithographing, etc.	Furnishing heat, light, power, etc.	Special and miscellaneous services.	Materials.	Stationery, drafting, etc., supplies.
Salaries, office of the Director	\$35,271.98	\$35,271.98										
Salaries, scientific assistants.	20,899.92	20,899.92										
Skilled laborers, etc.	19,999.85	19,999.85										
Topographic surveys.	346,916.17	229,399.66	\$77,357.68	\$5,797.35	\$52,768.04	\$10,613.95	\$569.85	\$5,780.45		\$5,268.19	\$1,190.59	\$841.95
Geologic surveys.	293,352.64	224,965.08	19,796.16	1,992.44	14,312.63	4,442.92	418.33	5,265.20	\$103.70	2,787.58	264.43	1,471.09
Mineral resources of Alaska.	96,698.63	58,542.19	12,779.35	5,498.85	5,081.66	871.65	149.75	1,024.28		2,776.42	227.07	175.87
Chemical and physical researches.	37,238.88	22,167.11	1,398.68	1,672.90	698.60	183.67	47.26	1,256.37	268.69	462.42	444.25	889.31
Preparation of illustrations.	18,217.66	16,188.75	17.10				18.63	1,700.75			2.68	71.75
Mineral resources of the United States.	74,119.70	62,271.19	3,260.64	333.16	2,841.13	7.65	908.48	182.23	1.75	439.84	15.05	499.25
Gaging streams, etc.	145,479.37	109,910.13	12,617.91	961.61	6,819.84	842.02	603.01	2,227.05		852.61	651.62	863.28
Books for the library.	1,025.76			7.90								
Geologic maps of the United States.	78,641.37	61,134.05	68.45	79.46	68.96		52.71	2,403.35	1,108.26	561.97	1,529.63	9,086.73
Surveying national forests.	74,282.52	45,881.15	2,618.23	1,869.35	3,169.58	5,852.93	89.93	305.18		272.84	317.43	104.02
	1,251,142.85	915,650.98	79,797.00	18,250.12	65,140.46	22,314.79	2,799.74	19,033.87	1,482.30	11,421.37	4,642.65	14,073.26
Appropriation.	Fuel.	Mechanic's, engineer's, etc., supplies.	Cleaning and toilet supplies.	Wearing apparel.	Forage and other supplies for animals.	Provisions.	Ammunition and explosives.	Special and miscellaneous supplies.	Equipment (including live stock).	Structures (bench marks).	Rent of buildings.	Fees for licenses, permits, etc.
Salaries, office of the Director												
Salaries, scientific assistants.												
Skilled laborers, etc.												
Topographic surveys.	\$315.43	\$60.44	\$45.60	\$61.40	\$5,768.58	\$9,705.03		\$306.18	\$6,742.15	\$4,945.24	\$32.55	\$36.75
Geologic surveys.	147.88	96.95	74.93	60.68	2,877.40	5,621.22	\$33.35	203.63	6,524.00		47.25	4.72
Mineral resources of Alaska.	68.62	28.12	67.72	360.25	1,293.69	2,773.94	70.72	83.69	6,860.93		16.00	
Chemical and physical researches.	418.62	86.43	6.77	9.00	1,119.69	606.28	6.66	116.98	7,468.18		51.53	1.00
Preparation of illustrations.									228.10			
Mineral resources of the United States.	90	130.52	10.90	201.90	174.36	355.13	2.96	6.17	2,027.98		833.00	50
Gaging streams, etc.	21.20		28.45					64.99	6,011.07		2,766.31	1.60
Books for the library.	88.16	442.64	27.66	17.64					1,070.12			
Geologic maps of the United States.	86.88	3.26	75.62	3.00	1,479.58	5,838.59	11.30	35.67	4,866.26	1,336.95	75.50	
Surveying national forests.												
	1,142.69	834.24	387.35	713.77	11,113.10	24,874.49	124.98	810.21	47,156.60	5,681.19	3,813.24	34.47

LIBRARY.

During the year the library has received by purchase and exchange 12,886 books and pamphlets and 1,124 maps, some of which are of temporary value only and will not be recorded as accessions to the permanent collection. A careful estimate shows that the library now contains 87,000 books, 100,000 pamphlets, and about 100,000 maps. Accessions are restricted as closely as possible to publications that consider subjects within the scope of the Survey's work and that will probably be of permanent value. Publications on other scientific subjects are transferred to the Library of Congress. Notwithstanding the efforts to confine the increase to the narrowest limits consistent with usefulness, the need of additional shelf room is now urgent.

The number of persons consulting the library during the year was 11,077, and 11,126 books and 317 maps were loaned for use outside.

The cataloguing of current accessions by full title entries in the author and subject catalogues was kept up to date. During the year 3,481 volumes and maps were catalogued.

Additions to the card catalogue during the year numbered 7,522. The Survey continues to furnish to the Library of Congress, for printing on its cards, the catalogue entries of geologic publications; of these entries 542 were supplied during the year.

The correspondence consisted of 4,587 letters received and 3,132 letters written and, as in other years, related largely to the exchange of publications. The list of institutions to which full sets of Survey publications are distributed now numbers 311 in the United States and 564 in foreign countries, a total of 875. Publications that are of value to the library are received in exchange from most of the institutions on this list. To an additional list of 523 persons and institutions, domestic and foreign, selected publications are furnished in return for certain of their own publications supplied to the library. The geologic folios are furnished to 380 libraries, in addition to the depository libraries supplied by the superintendent of documents, Government Printing Office.

The bibliography of North American geology for 1910 was completed and issued as Bulletin 495. It contained 1,410 author entries, an increase of 105 over the volume for 1909. The bibliography for 1911, containing 1,266 author entries, will be ready for the printer in July and will be published as Bulletin 524.

The personnel of the library consisted of the librarian, the assistant librarian, two cataloguers, and three other persons.

**REPORT OF THE DIRECTOR OF THE BUREAU
OF MINES.**

407

REPORT OF THE DIRECTOR OF THE BUREAU OF MINES.

JOSEPH A. HOLMES, *Director.*

PURPOSE OF THE BUREAU OF MINES.

The general purpose of the Bureau of Mines is to conduct, in behalf of the public welfare, fundamental inquiries and investigations into the mining industry. The two phases of the industry of greatest national concern are safety and efficiency—safeguarding the lives of our miners and insuring the most efficient and least wasteful development and use of our mineral resources.

These inquiries and investigations are national in scope; they do not contemplate the safeguarding of the life of the individual miner nor the promotion of the interests of the individual mine owner or operator, but seek the development of methods that will increase the safety of all miners and will promote the upbuilding and permanence of the whole mineral industry. Yet, although the advancement of the public welfare is the primary purpose of this work, it is obvious that broad fundamental inquiries and researches can not fail to confer benefits on the individual miner and the individual mine owner. Hence, the function of the Bureau of Mines may be defined as the conducting of inquiries and investigations that have for their purpose the improvement of health conditions, and the increase of safety, efficiency, and economic development in the mining, quarrying, metallurgical, and miscellaneous mineral industries of the country.

The scope of the investigations that the bureau has conducted is defined as follows in the act of Congress (36 Stat., 369) effective July 1, 1910, under which the bureau is established:

It shall be the province and the duty of said bureau and its director, under the direction of the Secretary of the Interior, to make diligent investigation of the methods of mining, especially in relation to the safety of miners, and the appliances best adapted to prevent accidents, the possible improvement of conditions under which mining operations are carried on, the treatment of ores and other mineral substances, the use of explosives and electricity, the prevention of accidents, and other inquiries and technologic investigations pertinent to said industries, and from time to time make such public reports of the work, investigations, and information obtained as the Secretary of said department may direct with the recommendations of such bureau.

The Secretary of the Interior, by another section of the act, was authorized to transfer to the Bureau of Mines from the United States Geological Survey the analyzing and testing of coals, lignites, and other mineral-fuel substances, and the investigation as to the causes of mine explosions.

SOME BENEFITS FROM THE WORK OF THE BUREAU OF MINES.

The work of the Bureau of Mines has not been continued long enough to make possible any accurate measure of the benefits to come from it, but some of the benefits already apparent are mentioned below. In this connection large credit is to be given to many private individuals—engineers, operators, and miners—and to many State mine inspectors who have aided in bringing about these results.

IMPROVEMENTS IN MINE SAFETY AND IN MINING CONDITIONS.

It should be borne in mind that much of the work now under way in the Bureau of Mines was begun some two years prior to the establishment of the bureau and was transferred to it.

At the beginning of this work black powder, with its long, hot flame, was in general use throughout the coal fields of the country, even in mines where the presence of inflammable gas and dust rendered its use dangerous. The explosives investigations now under way by the bureau have been largely instrumental in bringing about the adoption, in these more dangerous coal mines, of a new type of explosives with a short and relatively cool flame. The use of this type of explosives, now generally designated "permissible explosives," has increased from a small beginning a few years ago to more than 13,000,000 pounds during 1911.

This revolution in the use of explosives in coal mining has not only aided in reducing the number of mine disasters, but also in reducing the number of individual accidents. Miners, mine operators, and mining engineers have expressed the opinion that the work of the bureau in investigating explosives has alone a value far greater than the entire cost of maintaining the bureau since its establishment.

There is still much to be accomplished in bringing this work in behalf of safety to a higher state of perfection, and it is of great importance that investigations should be conducted in connection with explosives for use in the metal mines and quarries of the country.

As regards the work of the bureau in investigating mine explosions, it may reasonably be claimed that much has been accomplished. This statement applies not only to the study of the prevention of explosions, but also to the study of means of limiting such explosions as may start, through unexpected inbursts of explosive gas or

other causes not controlled by reasonable precautions, to certain rooms or sections of the mine, thus helping to reduce greatly the number of persons that might be killed by future explosions in spite of the preventive measures adopted.

Through the developments from the results obtained, there has been during the past two years a considerable reduction in the number of lives lost in the coal mines of the country from mine explosions.

The work of the bureau has called especial attention to the risks and the precautions that should be taken in connection with the use of electricity in mining, especially in mines where there is danger of explosions from the presence of gas or inflammable dust, or both. It has pointed out the dangers from the use of electric incandescent lamps in such mines and the types of lamps which can be used with a larger degree of safety; has indicated the types of electric motors that should be used in such mines, and has called attention to the kinds of insulation that may best be employed in mines where the agencies destructive to insulation act most vigorously.

The precautions and other improvements recommended by the bureau are being adopted as rapidly as conditions permit, and already through its investigations and the cooperative efforts of mining engineers and mine owners the lessening of accidents from electricity in mines is becoming evident.

The investigations of the bureau in connection with accidents from falls of roof and of coal and from failure of mine equipment have been too few and too incomplete to justify any expectation of extended beneficial results at once; but the safety recommendations of the bureau, based on preliminary examinations, are already being adopted widely in the coal mines of the country.

The investigations of mine fires have resulted in making clear many of the contributory causes of such fires and have shown the proper equipment and methods for preventing and fighting fires. Especial attention has been given to the analysis of the atmosphere of fire areas as an aid in determining whether an area has been so sealed that outside air can not reach the fire, which, in such event, will be smothered. The findings of the bureau in this respect are proving of service to operators and to State mine inspectors.

The mine-rescue work, including both investigations and general demonstration and educational work, has been carried on in connection with the operations of the mine-rescue cars and mine-rescue stations and has already yielded worthy results. Some new methods have been adopted, and in the first-aid and the rescue methods several thousand miners have been given training that will prove useful to them and to their fellow miners in time of minor accidents or of great mine disasters.

In connection with such rescue work, some 20 lives have been saved by employees of the Bureau of Mines, and several additional lives have been saved by miners trained by the bureau through the operation of the mine-rescue cars and stations. Meanwhile, the general demonstrations and illustrated lectures given by the employees of the bureau in connection with the work of the cars have been attended by more than 200,000 miners in different parts of the country, and some 2,000 miners have been granted certificates as fully trained in mine-rescue and first-aid work.

Another important part of the movement for greater safety in mines to which the bureau has contributed largely is the organization of private mine-rescue stations, equipped and maintained at the coal mines by the larger operators. More than 1,500 sets of artificial breathing apparatus have been purchased and are now in use at such stations, and in addition a half dozen of the larger coal companies have equipped and are operating special mine-rescue cars for use at the groups of mines under their management. One of the States has equipped and is now operating three mine-rescue stations and three mine-rescue cars.

The investigation of certain miners' diseases, especially "miners' consumption," or miners' phthisis, and miners' hookworm, has been undertaken. Attention has already been called to methods which should be adopted looking to a large reduction or complete elimination of these diseases in mining camps where they prevail and to the preventive methods that should be employed in other mining camps where conditions are favorable to the development of these diseases.

This work has been carried on in cooperation with the Public Health Service, and if properly conducted can not fail to lead to immediate improvement in those mining conditions that are largely responsible for the spread of such diseases.

In this connection the Bureau of Mines has also taken up the study of those conditions in the larger metallurgical plants of the country that affect more or less adversely the health of the employees. Already the attention of those in charge of such plants is being called to the need as well as the nature of remedial measures.

It is encouraging to note that a beginning is being made in the reduction of the death rate from accidents in coal mining in the United States, as is shown by the tabular statement given below. It is not claimed that the lessening death rate indicated by this table was due wholly to these investigations, but doubtless they helped to bring it about, not only by bringing out new facts, but also by procuring the active cooperation of miners, mine owners, and mine inspectors in this movement.

*Production, number of men employed, and number of men killed in and about the coal mines of the United States in the calendar years 1907 to 1911, inclusive.**

Year.	Production (short tons). ^b	Number em- ployed. ^b	Production (short tons). ^c	Number em- ployed. ^c	Number killed.			Produc- tion per death (short tons).
					Total.	Per 1,000 em- ployed.	Per 1,000,000 short tons mined.	
1907.....	490,363,424	680,462	461,406,000	655,418	3,197	4.88	6.93	144,000
1908.....	415,842,098	690,438	404,933,000	672,794	2,449	3.64	6.05	165,000
1909.....	460,814,616	666,565	460,761,000	666,526	2,608	4.00	5.79	173,000
1910.....	501,586,878	725,030	501,586,000	725,030	2,840	3.92	5.66	177,000
1911.....	466,221,168	728,348	466,221,000	728,348	2,719	3.73	5.48	182,000
Total.....	2,354,838,284	3,490,863	2,324,917,000	3,448,113	13,873	-----	-----	-----
Average.....	470,967,657	698,173	464,983,000	689,623	2,775	4.02	5.97	168,000

* The figures for production and number of men employed are from "Mineral Resources of the United States," E. W. Parker, U. S. Geol. Survey, except for the number of men employed in 1911, which were compiled by the Bureau of Mines.

^b These figures represent the total production and the total number of employees in the entire coal-mining industry of the United States.

^c These figures represent the production and the number of men employed in those States in which records of fatal accidents are in existence. The figures are directly comparable with the number of men killed as given in the fifth column and are those on which the mortality rates given herewith are based. It will be noted that the portion of the industry not represented in the rates for 1907-1909 is extremely small and that in 1910-11 the entire industry is covered.

MINE-SAFETY LAWS AND REGULATIONS.

In order to be able to meet frequent demands from the mining States for information concerning legislation that has been found necessary or beneficial, and the rules and regulations that have proved useful in safeguarding the lives of miners in different mining countries and States, a large amount of pertinent information has been already brought together by the bureau and is now being digested and supplied to the States for use as a basis for improved State legislation.

Much of this information is also sent direct to mine owners and miners for their own consideration in studying the possibilities of increasing safety in the mines of the different coal fields. This work has been under way for nearly three years and is generally considered one of the most useful phases of the work that the bureau has undertaken in behalf of mine safety.

SOME BENEFITS FROM FUEL INVESTIGATIONS.

The larger part of the coal now bought by the Government is purchased under the general technical supervision of the Bureau of Mines. The cost of purchases under specifications prepared by the bureau for the use of the Government now aggregates more than \$5,000,000 per annum, and the additional fuel bought under the general advice of the bureau now aggregates in purchase cost some \$3,000,000 per annum more, making the total value not less than \$8,000,000.

The benefits to the Government from this work of the bureau have been both general and special. In the case of the purchase of coal by the Isthmian Canal Commission for the Panama Railroad during 1910 and 1911 the actual sum of money saved by the Government was nearly \$75,000 and the real saving was probably several times these figures, because the method of purchase insured deliveries of coal of a higher grade than would otherwise have been obtained.

Similar benefits have developed each year in the case of fuels purchased by other branches of the Government service, though in no other individual case have the benefits been as large as in the case of the Isthmian Canal Commission.

The benefits to the general public resulting from this work for the Government may be indicated by the fact that more than 50 of the larger cities, a number of States, and a large number of private corporations and business concerns in different parts of the country have followed the general plans adopted by the Government for the purchase of its coal.

The analyses of coals occurring in different parts of the country, analyses that have been made in the testing of these coals for the use of the Government, have been of great service to engineers in charge of power plants and to manufacturing industries throughout the country, enabling users of fuel to determine in advance the character of the coals available for local or special use.

Still more important, probably, are the investigations carried on by the bureau looking to an increased efficiency in the burning of coal at the various power and heating plants of the public buildings of the Government in different parts of the country.

These investigations have not only resulted in recognized benefits to the Government itself, but also to power plants in cities and to private persons in many parts of the country.

Stimulated by investigations undertaken by the bureau a considerable briquetting industry has developed in a number of places, which is making decided progress in utilizing the slack or waste coal of the country by pressing it into briquets and thereby increasing its fuel value.

The utilization of fuels that have heretofore been considered waste products because of their being low grade and containing an excessively high proportion of ash has been much aided through the Government's investigations in connection with the use of the gas producer for low-grade fuels.

In its preliminary investigation into the subject of waste of resources in the mining of coal and other mineral products, the bureau has already contributed to an awakening of public interest and an awakening of many of the mine operators of the country to the

importance of a thorough examination into this subject. It is hoped that this examination can be made, for it will, if made, point the way toward more efficient and less wasteful methods of mining, handling, and utilizing the more important mineral resources of the country.

WHERE THE BUREAU'S WORK IS DONE.

The Bureau of Mines has its headquarters in the city of Washington in a rented building at the intersection of Eighth and G Streets NW. Here the administrative work of the bureau and certain of the investigations are conducted. The bureau has a mining experiment station in the city of Pittsburgh, Pa., located temporarily on the Government reservation known as the Pittsburgh supply depot, which is under the control of the Quartermaster's Department of the Army. By an agreement between the Secretary of War and the Secretary of the Interior the station is housed temporarily in buildings on these grounds. At this Pittsburgh station the bureau conducts its principal technologic investigations and inquiries relative to the coal and iron industries. The bureau also has a small laboratory in the customs building in San Francisco, Cal., where it has carried on investigations of fuel oils for the use of the Government and of smelter fumes injurious to national forests. In addition, the bureau operates six mine-safety stations, located at Pittsburgh, Pa., Knoxville, Tenn., Birmingham, Ala., Urbana, Ill., McAlester, Okla., and Seattle, Wash., and it also operates seven mine-safety or mine-rescue cars, these cars being distributed in the principal coal fields of the country.

ORGANIZATION.

The organization of the Bureau of Mines includes an administrative division, with headquarters at Washington, that has general supervision of the conduct of the bureau's investigations and the publication of reports dealing with the results of these investigations; a mining, a mechanical, and a chemical division, each in charge of a division chief, with headquarters at the experiment station of the bureau in Pittsburgh, and a miscellaneous mineral industry division with headquarters in Washington. In addition to the above the director of the bureau gives personal supervision to several mining and metallurgical investigations that are being carried on in different parts of the country.

ADMINISTRATIVE DIVISION.

The administrative division is in immediate charge of the director, J. A. Holmes, and the assistant to the director, Van. H. Manning, who have offices in Washington. In this division are grouped those

sections of the bureau that have charge of such strictly administrative functions as the publication of reports, the receipt and disbursement of funds, the purchase of supplies, and the care of correspondence and records.

Closely associated with the administrative division is the division of miscellaneous mineral industries, under C. L. Parsons, chief mineral chemist, which has to do with problems of safety and efficiency in the mining and treatment of various minerals; and the investigations of smelter problems and of the damage to national forests from smelter fumes, under the direction of F. G. Cottrell, chief physical chemist.

The local administration of the mining experiment station at Pittsburgh is intrusted to the engineer in charge, H. M. Wilson, with the cooperation of the chief mining engineer, G. S. Rice, the chief mechanical engineer, O. P. Hood, and the chief chemist, G. A. Hulett.

MINING DIVISION.

The mining division is in charge of G. S. Rice, chief mining engineer, with headquarters in Pittsburgh. He has supervision over various investigations relating to the health, safety, and instruction of miners, the lessening of waste in mining, and the inspection of mines in Alaska. The investigations have been divided into three groups or sections, which deal, respectively, with general investigations concerning mining; the study at the experimental mine of the causes of mine explosions and the means of preventing or limiting them; and the operation of the six mine-rescue stations and the seven mine-rescue cars that are used for purposes of investigation and mine-safety instruction in the coal fields of the country.

MECHANICAL DIVISION.

The mechanical division is in charge of O. P. Hood, chief mechanical engineer, with headquarters in Pittsburgh. Part of the work of this division concerns fuel investigations, part of it concerns mine-accidents investigations, and part of it concerns the supervision of the power plant at the Pittsburgh experiment station, and the general upkeep of the station.

The various investigations conducted under the supervision of the chief mechanical engineer include the following work:

Inspection of fuel purchased on a specification basis for the use of the Government; testing fuels with especial reference to efficiency and the prevention of smoke in Government power plants; special tests of lignite and peat; combustion of fuel in gas producers; tests of special fuels; the use of electricity in mining and metallurgy; and investigations of mining equipment with especial reference to safety.

CHEMICAL DIVISION.

The chemical division, in charge of G. A. Hulett, with headquarters in Pittsburgh, exercises control over the chemical laboratories engaged in making the analyses and tests necessary for the conduct of certain of the fuel, mining, and metallurgical investigations that the bureau is making. One of the laboratories, that for analyzing samples of fuel purchased for the Government, is in Washington, D. C.; the others are in Pittsburgh. In addition to making routine analyses of fuels, explosives, and mine gases and dusts, several of the laboratories are engaged on original investigation relating to problems of mine safety, the efficient utilization of fuel, or the prevention of waste in operations for the mining and treatment of minerals.

ORGANIZATION OF THE PITTSBURGH STATION.

During the year the work of the bureau at the Pittsburgh experiment station was organized under the above-mentioned three technical divisions, the mining, mechanical, and chemical. The local administrative details are placed under the engineer in charge, who also participates in the technical investigations. The chiefs of these divisions, as well as the engineer in charge, report to the director.

MINE INSPECTION IN ALASKA.

Mine inspection in Alaska, a work which is placed in the mining division, is under the general supervision of the Director of the Bureau of Mines. During the year Sumner S. Smith, Territorial mine inspector, with headquarters at Juneau, visited all the important mines in the Territory and noted the conditions in regard to safety at mines and reduction plants. The results of his observations are embodied in a separate report which will be transmitted to the Secretary of the Interior. ✓

SOME FEATURES OF THE YEAR'S WORK.

The investigations of the bureau during the fiscal year ended June 30, 1912, were conducted along the same general lines as during the preceding year. The more important problems studied related to the prevention of accidents and loss of life in coal mines and the efficient purchase and utilization of fuels by the Government.

The more notable features of the year's work, the progress made, and some of the significant results accomplished are briefly described in the following pages.

MINE-ACCIDENTS INVESTIGATIONS.

The investigations conducted by the bureau during the fiscal year 1912, like those of the preceding year, were devoted chiefly toward the prevention of large coal-mine disasters. The pressing need of in-

vestigations to determine the causes of and the means of preventing accidents in coal mines and in metal mines, and also the need of inquiries and investigations into the cause and the prevention of accidents and diseases incident to metallurgical and other mineral industries, was fully recognized, but in view of the limited funds at the disposal of the bureau for investigations it was deemed wiser to enlarge and push the investigations under way rather than to take up other investigations. New work was limited mainly to the collection of statistics of accidents in coal mines.

In the investigation of problems relating directly to efficiency and safety in the mining of coal good progress was made. Every mine in the United States at which an explosion or fire of any note occurred was visited by one or more engineers of the bureau who, in cooperation with or with the approval of the State or mine officials, investigated the cause of the disaster and rendered such aid as was possible in preventing further loss of life and resources.

In the endeavor to determine the underlying causes of mine explosions and mine fires and the means by which dangerous conditions may be most effectively prevented or abated other coal mines in many parts of the country were investigated.

In continuation of its investigations relating to the dangers that attend the use of electricity in coal mines the bureau has completed a series of tests to show how electric motors should be incased to render safer their operation in gaseous coal mines. It has conducted experiments that showed the possibility of igniting explosive mixtures of mine gases through the breaking of the bulbs of incandescent electric lamps in the presence of such gases, and it has made tests to ascertain the insulating materials best adapted for protecting miners or mill men from the danger of electric shock.

Tests and investigations to lessen the accidents attending the use of explosives in mining were continued at the Pittsburgh station and in the field. During the year 32 explosives were thoroughly tested and designated as "permissible" explosives for use in dusty and gaseous coal mines under the conditions prescribed by the bureau. On June 30, 1912, there were 88 explosives on this permissible list. New tests were devised and the test requirements were made more rigid to insure greater safety in the use of the explosives that might pass the tests. In testing and analyzing the explosives examined during the year over 10,000 tests, analyses, and determinations were made.

At its experimental mine near Bruceton, Pa., about 13 miles southwest of Pittsburgh, the bureau has continued its study of coal-mine explosions. This mine consists of two entries driven from the outcrop into the Pittsburgh coal. It is equipped with apparatus for recording the speed of an explosion and the pressure produced and for

automatically taking samples of the gases formed during an explosion.

At the end of the year the two main entries were in 980 feet from the outcrop. Improved instruments had been installed, and a series of 15 dust explosions had been made under predetermined conditions. The effect of different conditions on the violence of the explosions had been studied and a discussion thereof prepared for publication. The main purpose of the investigations at the mine is, of course, to discover the most efficient methods of preventing or limiting gas and dust explosions.

MINE-RESCUE CARS AND STATIONS.

To facilitate its investigations of mine disasters and to demonstrate the use of mine rescue apparatus and approved methods of rendering first aid to the injured, the bureau maintains six mine-rescue stations and seven mine-rescue cars in those of the larger coal fields in which mine disasters are most likely to occur. The stations are at Pittsburgh, Pa.; Urbana, Ill.; Knoxville, Tenn.; Seattle, Wash.; McAlester, Okla.; and Birmingham, Ala. The cars were distributed as follows:

Car 1, in the anthracite fields, with headquarters at Wilkes-Barre, Pa.

Car 2, in the coal fields of New Mexico, Colorado, and Utah, with headquarters at Trinidad, Colo., and Salt Lake City, Utah.

Car 3, in the coal fields of western Kentucky, Indiana, and Illinois, with headquarters at Evansville, Ind.

Car 4, in the coal fields of Wyoming, northern Colorado, and Utah, with headquarters at Rock Springs, Wyo.

Car 5, in the coal fields of Montana and Washington, with headquarters at Billings, Mont., and Seattle, Wash.

Car 6, in the coal fields of western Pennsylvania and northern West Virginia, with headquarters at Pittsburgh.

Car 7, in the coal fields of southern West Virginia, western Virginia, eastern Kentucky, and eastern Tennessee, with headquarters at Huntington, W. Va.

So many miners have desired to receive training in mine rescue and first-aid methods that the present training facilities are inadequate. By reason of insufficient supplies and equipment, these facilities were not operated during the year at more than 50 per cent of their maximum possible effectiveness.

Nearly 65,000 persons (mainly miners) visited the safety cars and stations; more than 36,000 miners attended the mine-safety lectures; more than 10,000 miners took partial training in rescue or first-aid work; and about 1,000 certificates were issued to miners showing proficiency in such work. Miners and operators in all coal fields have taken active interest in the demonstration work of the bureau, and many operators have organized and equipped mine rescue corps at their own mines at their own expense.

MINE-SAFETY DEMONSTRATION.

The first national mine-safety demonstration,¹ a notable event of the year, was held at Forbes Field, in Pittsburgh, on October 30, 1911. The demonstration was planned and managed by the engineers of the bureau, with the aid of the miners and coal operators of the Pittsburgh district. It embraced exhibits that demonstrated the character of nearly every branch of the bureau's investigative work in relation to mine accidents, including first-aid and mine-rescue work, coal-dust explosions, and also special coal-dust explosions at the bureau's experimental mine at Bruceton, Pa. Approximately 15,000 persons, chiefly miners, mine owners, and mining engineers, attended the demonstration. The principal field exhibits were witnessed by the President of the United States and many officials of both the National and State Governments. Teams of miners trained in first-aid and rescue work from every coal-mining State were in attendance and took part in the demonstration. The value of such demonstrations has been fully proven by the manner in which this demonstration has stimulated the adoption of safety precautions in all the coal fields of the country.

FUEL INVESTIGATIONS.

The fuel-testing work of the bureau dealt with the more efficient purchase and use by the Government of fuels purchased and used in different parts of the country. Since the wording of appropriation acts limited the fuel investigations conducted by the Bureau of Mines to the analyzing and testing of fuels belonging to or for the use of the United States, the various technologic researches and the routine work relating to the examination of fuels under this bureau embodies two general lines of inquiry, as follows:

1. The inspection and analysis of coals, lignite, and other mineral fuels purchased under specifications for the use of the Government, to ascertain whether these fuels conform to the stipulations of the contract under which they are purchased; the development of a proper specification under which different coals may be purchased for different purposes and different equipment; and the ascertaining of the most efficient equipment and method of using these fuels.

2. The investigation of coals, lignite, and other mineral fuels belonging to the Government.

The work of inspecting and analyzing fuel purchases was largely extended and made more efficient during the year. The samples

¹ Fully reported in Bulletin 44, Bureau of Mines, entitled "First National Mine-Safety Demonstration, Pittsburgh, Pa., October 30 and 31, 1911," by H. M. Wilson and A. H. Fay, with a chapter on "The Explosion at the Experimental Mine," by G. S. Rice, 1912. 75 pp., 7 pls.

represented coal and fuel oil for use at Government power plants, public buildings, and naval stations in different parts of the United States and in the Panama Canal Zone.

The collection of the samples was done by or under instructions from the Bureau of Mines; and the analysis and testing of the samples formed an important part of the work of the bureau.

The samples were collected wherever coal purchased under contract was being delivered to the Government. They represented deliveries made at public buildings in the District of Columbia, or at public buildings, naval stations, and Army posts in many parts of the United States, and also the deliveries made at the great coal-shipping ports, as New York and Norfolk, where coal was being delivered for the use of the Navy, the Panama Railway Co., or the Isthmian Canal Commission.

In the fiscal year 1912 the purchase of coal by the Government under specifications providing for payment according to the quality of coal delivered amounted to approximately 1,500,000 tons, costing \$4,750,000, notwithstanding the fact that the general plan was to apply the specification method of purchasing coal only to contracts of such size as warranted sampling, analysis, and heating-value tests. The tonnage sampled was 408,600 tons greater and its value was \$1,666,000 greater than in 1911.

The specifications applying to the purchase of coal for use on the battleships and naval vessels named the mines from which coal was to be shipped under a given contract. The occasional analyses of samples showed whether the coal shipped equalled in quality, and if not how much it was below, the standard established in the contract. Coal purchased under specifications of this nature and used on naval vessels amounted in round numbers to 730,000 tons during the fiscal year 1912.

Most of the samples analyzed and tested for heating values at the Washington laboratory represented coal purchased under specifications that provided for payment according to the quality of the delivered coal. Analyses of mine samples were generally made in the bureau's laboratory at Pittsburgh. During the fiscal year ended June 30, 1912, 11,300 coal samples were received at the Washington laboratory, an increase of 3,000 over the number for the preceding year.

The analyses and tests of fuels at the experiment station in Pittsburgh are made to indicate the character of the coal and other mineral fuels belonging to the United States and to show how these fuels may be best utilized.

In analyzing samples of coal and lignite and other mineral fuels at the Pittsburgh station, the procedure followed was essentially the same as that of the Washington laboratory except that ultimate as

well as proximate analyses were made at Pittsburgh. Continued effort was made to simplify and cheapen these methods in the interest of economy in the chemical work of the Government. During the fiscal year 1912 about 750 samples of coal and lignite, 200 samples of fuel oil, and 100 samples of natural gas were analyzed by the Pittsburgh station laboratory. The nature of the work, when carload samples of coal from Government lands are received, is as follows:

Combustion tests to determine the most efficient and least wasteful method of burning fuel in furnaces of the type used for heating the Government buildings, Army posts, naval stations, or Government ships in which it may be proposed to use such fuel.

The testing in the gas producer of another portion of the same shipment of coal from Government lands, in order to ascertain the suitability of the fuel for use in the producer and the conditions requisite for obtaining the largest yield of high-grade gas suitable for power and heating purposes.

The testing of another portion of the same coal or lignite in a briquet machine with different binders in order to determine the feasibility of briquetting the coal or lignite and the making of steaming or gas-producing tests with these briquets to determine the conditions under which they can be utilized most advantageously, and demonstrations, on a commercial scale, of the possibility of producing briquets from American lignites without the use of a binder.

Investigations into the character of the various petroleum found throughout the United States, with a view to determining their calorific value, chemical composition, and the various methods whereby they may be made most economically available for efficient use as power producers for the Government, especially on board ships; and investigations of the heavier distillates of petroleum, as well as of kerosene and gasoline, in order to ascertain their commercial value and their relative efficiency in internal-combustion engines for use in naval vessels.

Investigative studies of combustion within boiler furnaces and gas producers to ascertain the temperatures at which complete combustion of the gases takes place, and the means whereby the waste of heat up the smokestack and the production of smoke may be lessened.

Related investigations concern methods of mining and of preparing coal for market and of boring for and transporting oil and natural gas to ascertain how present wastes in mining and transportation may be most economically and efficiently lessened.

During the year the bureau continued its researches, both chemical and physical, to determine the true composition and properties of the different varieties of coal and the chemical and physical processes of combustion, in order to determine how each coal could be burned

most efficiently in a variety of Government heating and lighting plants. Experiments were conducted relating to the destructive distillation of fuels; the spontaneous combustion of coal, with especial reference to fire risks in storing coal on board ships, in closed bins, or on wooden wharfs; and the relative deterioration of coal during storage in open air, in closed bins, or under water. The results obtained in these tests are mentioned in the summarized discussion of the investigations in another part of this report.

NEEDS OF THE BUREAU.

The demands being made on the bureau by both the Government and the public continue to increase more rapidly than do the facilities for meeting them. These demands now are such as might be expected of a much older bureau with much larger income. The difficulty of complying with all these demands is increased, as is also their urgency, by the fact that they relate largely to saving the lives of miners. Neither the funds, the equipment, nor the buildings at the disposal of the new bureau for necessary investigations are sufficient to permit these investigations being conducted in the manner their importance warrants.

THE NEED OF BUILDINGS, GROUNDS, AND EQUIPMENT.

The experiment station at Pittsburgh is housed in buildings that are inadequate and unsuitable for the work being done there. They were constructed for arsenal and warehouse purposes more than half a century ago, and the space available is only a small part of that needed for the work under way. Furthermore, even these inadequate buildings and the grounds in which they stand are occupied by the permission of the War Department, and that department has asked that the buildings be vacated by the Bureau of Mines in order that they may be used again by the War Department for its own purposes. The grounds at Bruceton, Pa., some 10 miles southwest of Pittsburgh, which are used by the bureau for experimental work, are occupied by permission of the owner, this permission being granted from year to year. The bureau should have other and more adequate grounds and buildings provided for it, in order that the investigations already authorized can be conducted under conditions that will permit efficient work and conclusive results.

For much of the investigative work of the bureau the equipment now in use is as inadequate as are the buildings and grounds. This is true as regards both the fuel investigations started in 1904, for which new equipment is essential, and the mine-accidents investigations started in 1908. Furthermore, the mine-rescue work of the bureau has had to be curtailed, and important phases of it can not

be satisfactorily undertaken because of the lack of appropriate equipment. In the training and demonstration work of the mine-rescue stations and cars the number of miners trained is in many cases reduced to half the needed and the possible number by the lack of a sufficient supply of rescue outfits; and under such working operations it is impossible to keep any adequate supply of this equipment in proper condition for the more dangerous emergency work at mine disasters.

NEED OF EXTENDING MINE-RESCUE AND FIRST-AID WORK.

There is need of funds sufficient for the continuous operation of the eight mine-safety cars now owned by the bureau, and for the purchase, equipment, and maintenance in continuous service of two additional cars. Every effort has been made to equip and operate the cars on the most economical basis consistent with efficient service, and the strictest economy has been practiced in the care and maintenance of the six mine-rescue stations; but notwithstanding this fact, the cost of the work of training miners made it impossible to operate the cars during more than six and two-thirds months of the fiscal year.

In the United States there are more than 700,000 coal miners, at more than 15,000 mines, from which 500,000,000 tons of coal is now produced yearly. It is expected that ultimately mine-rescue and first-aid work among this great body of men will be taken care of locally through the training and organization of miners at each of the larger mines or groups of mines in the different coal fields; and that this work will then be supported largely by the coal-mining companies. Already a number of the large coal-mining companies have purchased and installed at their mines sets of mine-rescue and first-aid equipment, and maintain local rescue stations at their own expense. The number of such stations is steadily increasing. The work undertaken by the Bureau of Mines is pioneer educational work, temporary in character. Its chief purpose is the training of a sufficient number of miners in different parts of the country in first-aid, mine-rescue, and fire-fighting methods, so that they may be easily organized into local groups, or corps, equipped and maintained by the mining companies, and distributed so as to be within easy reach of all of the larger mines. During the year more than 30,000 miners have attended the lectures and demonstrations given from these mine-safety cars, and over 1,000 additional miners received training sufficient to enable them to participate in actual mine-rescue work, and more than twice that number have been added to the list of miners trained in first-aid practice.

A number of serious fires and other accidents in metal mines during the past few years have shown the urgent need of extending this

first-aid and even the mine-rescue training to mines of this class, and the success that has attended the limited work the bureau has been able to do at metal-mine disasters demonstrates beyond question the urgency of this extension.

If provision can be made for operating these mine-rescue cars for 10 months of the year, full twice the number of miners would be trained, and the general pioneer educational work among the miners would be pushed forward at a correspondingly increasing rate.

NEED OF EXTENDING ACCIDENT INVESTIGATIONS TO OTHER PHASES OF MINING INDUSTRY.

The coal-mine accidents investigations conducted by the bureau have largely been limited by the wording of appropriation acts to inquiries concerning the causes and prevention of mine explosions, although more than one-half of the fatalities in coal mines result from falls of roof, "slate," or coal, and injuries from mine cars and locomotives. By these two classes of accidents more than 1,700 men were killed in the coal mines of this country in the calendar year 1911. Yet the Bureau of Mines has not had at its disposal funds sufficient to render possible detailed investigations concerning the causes of these accidents and the methods adopted in other countries for preventing them.

Moreover, the mine-accidents investigations should be extended to include the collection of complete and reliable data concerning the character and number of accidents, as well as the methods of prevention, in all branches of the mining industry, metal mining as well as coal mining, and in metallurgical and miscellaneous mineral industries.

The available records indicate that the death rate in the metal mines of this country averages more than three for each thousand men employed, or, in other words, this rate is nearly as high as that in the coal mines. The death rate in the quarries of the country is also much larger than it should be, and is far larger than that in the quarries of other countries; and the same is true of our metallurgical plants.

The inquiries and investigations of the bureau should be extended to include those relating to health conditions in and about mines. At a small expenditure to cover expenses, without duplication of work but in cooperation with the Public Health Service, one or more surgeons should carry on investigations looking to the improvement of mine conditions. Preliminary inquiries and investigations have indicated the prevalence of tuberculosis and the presence of hookworm as miners' diseases in several different localities in the United States. It is important that this work should be extended more rapidly, because of the fact that the health conditions, as well as the risk

of accidents, may be influenced by conditions susceptible of easy improvement. Furthermore, the large and continuous influx of foreigners into the mining regions of the United States may bring to an increasing extent the hookworm and other diseases that exist in mines in parts of certain European countries.

Various questions that concern the health of workers in mines, quarries, and metallurgical plants can not be answered finally without investigations and inquiries that are national in scope. Among such questions are the most efficient methods of preventing the diseases peculiar to mining and metallurgical industries, and the most effective sanitary precautions to be observed in and about mines and in the various metallurgical occupations. The investigations and inquiries that are essential in the gathering of reliable information on these questions can be undertaken by the Bureau of Mines, in connection with its collection of accident statistics, in a prompt and efficient manner and at minimum expense.

NEED OF EXTENDING INVESTIGATIONS WITH A VIEW TO THE PREVENTION OF MINERAL WASTE.

There is urgent need of enlarging the inquiries and investigations of the bureau relative to increasing efficiency and lessening waste in the mining, quarrying, metallurgical, and miscellaneous mineral industries of the country. No one familiar with the enormous annual loss in mining and preparing coal for market and the huge waste of natural gas can fail to realize the need for such investigations, nor to realize that investigations concerning loss of life and waste of resources (safety and efficiency) must go hand in hand because of their intimate relations. The Nation has only one supply of mineral resources; and in the case of such resources as natural gas and coal, both the use and the waste described mean the actual destruction or loss of resources important to the national welfare. It is the duty of both the State and the Nation to see that these resources are used efficiently—that is, without unnecessary waste—notwithstanding the fact that in many cases the temporary profits as well as the personal safety are increased by the practice of highly wasteful methods. What the Bureau of Mines can do is to ascertain the facts, find out the possible improvements, and state them clearly to the public for such action as may be deemed practicable.

NEED OF NEW EQUIPMENT FOR FUEL INVESTIGATIONS.

For the fuel investigations the bureau needs new and more extensive equipment. The demands from the various branches of the Government service in connection with the purchase of coal and oil by the Government and the efficient use of these fuels have been too great for the bureau to meet. The work required and its financial impor-

tance to the Government are nearly four times now what they were only three years ago.

Over 11,500 samples of coal, lignite, and fuel oil, intended for the use of the Government, were analyzed by the bureau in the past fiscal year. The samples of coal represented 1,500,000 tons, valued at approximately \$4,750,000, and Government purchases of fuel aggregating during the year not less than \$8,000,000 were based upon the general analyses and examinations made by the Bureau of Mines; whereas in the fiscal year ended June 30, 1909, only 3,299 samples, representing 611,362 tons of coal, valued at \$1,858,750, were examined.

The various inquiries in regard to the fuels belonging to the Government need to be enlarged to include more detailed study of the characteristics of crude petroleum and fuel oils and their suitability for more efficient use under steam boilers or in internal-combustion engines. The studies of the characteristics of the different coals and lignites likewise need to be carried on more actively than heretofore, with especial reference to greater economy and efficiency in the use of these fuels by different branches of the Government service in different parts of the country.

It is for this work that much of the new equipment is needed to supplement and in some cases to replace that now on hand and which, owing to its constant use for eight years, needs to be replaced or extensively repaired.

NEED OF EXTENDING INVESTIGATIONS TO THE METAL-MINING INDUSTRIES OF THE WESTERN STATES.

Inasmuch as the appropriations for the Bureau of Mines during the past year were not sufficient to permit any extension of the work beyond the investigations relating to the mining and utilization of coal it was not possible to extend these investigations to the metal-mining industries. Meanwhile, however, the ratio of accidents to the number of men employed has been larger in many metal mines of the country than it has been in many of the coal mines, and the average is nearly the same in the two. There is therefore serious need for the extension of the mine-accident work into the metal-mining field.

Moreover, the loss of life in connection with metallurgical operations in different parts of the country deserves special consideration. The serious need of inquiries and investigations looking to the improvement of conditions at metallurgical plants has become more and more apparent as preliminary inquiries have been made.

Furthermore, during the past several years the development in the mining industries of the Western States has fallen far short of that in agriculture. In some of the States there has been a retreat rather than an advance in mining development. It is believed that thor-

ough inquiries and investigations concerning metal-mining conditions in the Western States would do much toward improving the safety and health conditions and toward lessening the waste of resources, as well as toward the general advancing and upbuilding of these industries.

The extensive waste in the mining, treatment, and utilization of mineral resources essential to our national welfare gives to these investigations a national importance they would not otherwise possess. Furthermore, in these States the mineral resources, upon which the welfare of the arid regions especially must always so largely depend, are to such an extent in nontaxable Government lands that the fact serves as another basis for demands on the national Bureau of Mines for aid and cooperation.

MINING INVESTIGATIONS.

SPECIAL INVESTIGATIONS OF FOREIGN MINES.

G. S. Rice, chief mining engineer, in addition to his usual duties, headed a party of mining engineers on a three months' trip through the European mines. The object of this investigation was to observe the precautions that were taken in preventing mine accidents, the methods of mining, with a view to lessening waste of resources and loss of life or limb, and the method of "flushing" or hydraulic mine filling to prevent surface subsidence, loss of coal, and mine fires. This method of mine filling with sand and other material originated in the anthracite region of Pennsylvania; but it is now more extensively employed in the Westfalian and Upper Silesian coal fields of Germany, and in the French and Belgian coal mines for working thick or thin "pitching" beds like those in our own anthracite fields. The engineers who constituted the party besides Mr. Rice were Messrs. Erskine Ramsey, vice president, Pratt Consolidated Coal Co., Birmingham, Ala.; A. B. Jessup, chief mining engineer, Lehigh Valley Coal Co., Wilkes-Barre, Pa.; H. M. Warren, electrical engineer, Delaware, Lackawanna & Western Railroad, Scranton, Pa.; G. B. Hadesty, division superintendent of the Philadelphia & Reading Railway Coal & Iron Co., Pottsville, Pa.; and on a portion of the trip, John Bart, of the Berwind-White Coal Co., Windber, Pa. Detailed reports of these examinations of European coal mines have been prepared by members of the party and are now being compiled or assembled by Mr. Rice for publication by the bureau.

The purpose of the bureau in organizing such joint examinations of foreign coal mines is to bring about the adoption in American mining operations of any practices that elsewhere have proved effective in reducing the loss of life or the waste of resources and seem applicable to American conditions. The plan adopted as the

one most likely to facilitate the accomplishment of this purpose is as follows:

When the bureau decides to send one of its engineers to one or more foreign countries to study certain safety problems, which have been successfully worked out there, a few of the larger coal companies likely to be interested in similar problems are invited to send (at their own expense) mining engineers or mine managers as members of a small party to make these examinations abroad under the leadership of the bureau's engineer, who carries official letters of introduction and requests for cooperation. Each member of such a party is expected to submit a special report to his own company, and all members of the party are expected to join in preparing a general report for publication by the bureau. In this way, at minimum cost, including only the salary and traveling expenses of its own engineer, the bureau obtains for the industry the combined judgment of a number of trained and experienced men, and each company sending a representative obtains useful information that would be far less available to an engineer traveling abroad in a private capacity.

INVESTIGATION OF MINE DISASTERS.

As a result of the investigation of mine explosions and mine fires by the engineers under G. S. Rice, chief mining engineer, the following features have been noticed:

GAS EXPLOSIONS.

At a number of mines where disasters have occurred the operators had considered the mines nongaseous, and accordingly had not taken sufficient precautions to insure ventilation at the face. Usually the mines had ample fan capacity, but investigation showed that at the face there was insufficient current, largely because of leaky stoppings. In some mines too much reliance was placed on line brattices to conduct the air current to the face. In some mines rooms had been turned ahead of the last break-through, so that when a fall of roof had knocked down the brattice, or curtains, or the doors on the roadways had been carelessly left open for greater convenience in haulage, there was no circulation of air, with the result that gas had collected and been ignited by an open light or the flame from a shot of black powder or dynamite.

Several disasters were caused by the mine foremen allowing miners with naked lamps to enter districts containing gas, or by the fire boss endeavoring to "brush" or fan out a pocket of gas by using a coal or canvas sheet and thus throwing the inflammable gas upon an open light. In the majority of American mines there is very little inflammable gas (methane chiefly) under ordinary conditions, but at a time of low barometer, or when there has been a large fall of

roof, or through encountering a fault or crevice containing gas, dangerous conditions arise suddenly between the time when the mine is inspected in the early morning and when the miner enters the working place. Many such disasters have occurred in so-called "nongaseous mines" in which open lights were used. When a mine is considered gaseous safety lamps are generally used, and many other precautions are taken. The absence of gas for days or weeks lulls suspicion and causes relaxation of effort on the part of the foreman. The remedy would appear to be a greater extension of the use of safety lamps.

COAL-DUST EXPLOSIONS.

In practically all the bituminous-coal mines in which disastrous coal-dust explosions have occurred the engineers of the bureau have observed that no attention was paid to the accumulations of dry coal dust in the inner workings. In some mines near the shaft or on the main roads artificial watering had been done, which satisfied the casual visitor that the conditions were safe; but the inner workings contained vast amounts of inflammable coal dust, which, when ignited by a small explosion of gas or a blown-out shot, or other cause, had initiated an explosion that traversed not only these inner workings but also more or less of the outer roadways which had been more or less dampened by sprinkling.

Even where an explosion has been stopped before it reached the mouth of the mine the afterdamp gases have smothered the miners throughout a much larger area than that traversed by the explosion. None of the mines in which large dust explosions have occurred had prior to the disaster employed systematic humidifying with steam.

ACCIDENTS FROM IMPROPER HANDLING OR USE OF EXPLOSIVES.

In many mines examined by the mining engineers explosives were carelessly handled. In certain instances the operators supposed that they had admirable shot-firing and inspection systems, but examination at the face disclosed that there had been many blown-out shots. In some cases it was found that detonators and explosives had been kept in the same box, and that shot firers had carried detonators in the same sack with the explosives. Where firing had been done with a battery it was found that many batteries were of the ordinary dry-cell type without any safeguards. In one accident during the year the State mine inspector reported that a shot firer was killed by putting a dry-cell battery in the same sack with detonators and explosives.

The use of permissible explosives that passed the tests of this bureau has much decreased the dangers of igniting gas and dust, but it has been found that they have not been used in some mines

according to the methods prescribed by the bureau; that is, they have not been properly tamped or the charge limit has been exceeded.

In many cases the miner has been permitted to have too large a quantity of explosives in his possession. In some States he is permitted to have 25 pounds or more of black powder. •

The method of bringing explosives into the mine and the method of storing them is bad at many mines. Stringent regulations on this subject should be made by State authorities. In some districts kegs of powder or other explosives belonging to the miners are left exposed in their respective working places instead of being placed in tight boxes with locks.

ACCIDENTS FROM ELECTRICITY.

Several disasters have been attributed to electric arcs from grounds or short circuits, igniting coal dust or gas. Trolley haulage should not be permitted in entries in which there is one-half per cent or more of inflammable gas.

In a large number of mines using electrical machinery it has been found that the installation was very imperfect, particularly as regards insulation. The use of electricity in coal mines is constantly extending, and an increasing number of accidents has been attributed to its use; hence greater care should be exercised in insulation. It would be desirable if every coal-mining State had an electrical engineer on its inspection staff.

MINE LIGHTING AND ACCIDENTS.

In all but two of the mines in which large disastrous explosions have occurred during the past few years open lights have been used. In many of these mines there was more or less inflammable gas, generally not in noticeable quantities, but sufficient to produce dangerous conditions under certain circumstances. On the other hand, the mines that have been considered and acknowledged by the operators to be gaseous have generally been free from explosions, although one small disaster was attributed to the imperfect condition of a safety lamp. Safety lamps give a poorer light and are especially unsatisfactory for examination of the roof and floor, but their use tends to produce discipline and care in other directions. Where used, however, they must be inspected daily by some competent person. Portable electric lamps give much better light and are being adopted to some extent in the Pennsylvania anthracite field. Different types of electric lights for use by miners are now under investigation by the bureau at Pittsburgh. If the safety conditions are to be improved, it seems probable that the use of these electric lamps will be widely extended, and will much lessen the danger of explosions and mine fires that attends the use of open lights.

NEED OF BETTER VENTILATION AT THE WORKING FACE.

As already mentioned, there is great need for improvement in mine ventilation, especially at the face where the miner works. Mine foremen are sometimes too easily satisfied with sending down large volumes of air into the mine and disregard the fact that it does not reach the face in sufficient quantity to sweep away gases that may accumulate there, either the fire damp from the coal or poisonous gases from the powder used in bringing down the coal. Generally the fan equipment at coal mines is sufficient, but in many of these mines the underground system of ventilation in the more remote parts of the mines is not as efficient as it should be. It is usually easy enough to have good air along the main entries and haulage roads and manways, where the men travel, but it is more difficult, though just as important, to have good air at the places where the men work during the day.

INVESTIGATION OF MINE FIRES.

Some disastrous mine fires have occurred during the past few years through gross carelessness in handling open lights, or from short circuits of electric currents due to improper insulation, or from underground power plants. These have been the causes of fires in certain metal mines investigated, as well as in coal mines. One bad fire, which occasioned loss of life, was caused by setting fire to oil used for lubrication. Such instances are due both to the use of open lights and to the arrangements for storing the oil or other inflammable material. There has been a great disregard of danger in the employment of wood for underground engine houses, pump rooms, and stables, which are especially liable to fires. But in some districts, following disastrous mine fires, as in Illinois and in the anthracite fields of Pennsylvania, many drastic improvements have been made. Similar precautions against mine fires should be taken and facilities for fighting such fires should be introduced in mines throughout the country, without awaiting the occurrence of additional mine disasters. A preliminary report on mine fires, by G. S. Rice, has been prepared for publication as a technical paper (No. 24), and another, by J. W. Paul, has been prepared for publication as a miners' circular (No. 10).

NEED OF BETTER ESCAPE ARRANGEMENTS.

Many of the mines in this country have inadequate facilities for escape in case of fire or explosion. These should always be in duplicate, and either escape way should provide adequate means of exit from the mine. Few mines have sufficient provision in the way of fire-fighting equipment in and about the exit ways. The State

of Illinois has passed some excellent laws and regulations for fire fundamental regulations requiring such improvements. fighting, but unfortunately very few of the mining States have even

NEED OF REFUGE CHAMBERS.

Most victims of explosion disasters have been overcome by after-damp and not by violence or burning, but some miners have escaped from disasters by bratticing themselves off in inner workings. These facts show that had refuge chambers been provided many of the miners that were lost might have been saved. Chambers of simple type are easy to make, and the several engineers of the bureau advise that all mines provide them. Even if nothing more than several mine rooms or chambers of ordinary size in different parts of the mine were utilized, these could have tight-fitting doors in duplicate, a supply of drinking water in sealed bottles, a limited quantity of food in cans, a supply of first-aid equipment, a few fire extinguishers, and, if practicable, a protected telephone. Such rooms would prove useful under many conditions arising in the daily routine of mining operations, and would prove a good investment even though no large disasters occurred. Rescue parties would naturally aim to reach these rescue chambers promptly before making a random search throughout the mine; and in time of trouble, when ordinary escape ways were blocked by poisonous gases or rock falls, men in the mines would endeavor to reach these safety chambers. Where the mines are not deep, special holes might be bored from the surface down into such chambers, through which holes fresh air might be forced when needed below and through which telephone lines could be run to the surface.

While thus calling attention to the advantages of such rescue chambers, the bureau has not urged their installation as equal in importance to precautionary measures looking to the prevention of mine disasters. But interest in them increases as it is realized that mine disasters may still occur notwithstanding all precautions, though, let it be hoped, at increasingly less frequent intervals.

FALLS OF ROOF AND COAL.

By far the largest annual loss of lives in mines is caused by falls of roof and coal; this is true of metal mines as well as coal mines. The underlying cause of this large loss, which in the calendar year 1910 was 1,310 lives, and in 1911, 1,321 lives, is being sought by the mining engineers of this bureau. Though the immediate cause is lack of sufficient timber, the mining system seems also at fault, in view of the much smaller loss of life per thousand employed in the mines of Europe. Closely connected with this question is the reckless

use of explosives, which shatters the roof, and the lack of sufficient direct supervision of the working faces by the mine foremen. The use of less timber and fewer mine foremen but more powder in American coal mines as compared with those in European countries meets the American demand for cheaper coal, but at heavy cost in the loss of human life and waste of fuel resources.

These facts need not be considered as a basis of criticism of either the miner or the mine owner, but they indicate an urgent need for recasting the economic conditions under which the coal-mining industry is now being operated.

Meanwhile the Bureau of Mines is beginning a careful examination into the nature and means of preventing accidents from these and other miscellaneous causes.

PERSONNEL AND PROCEDURE.

The engineers engaged in these mining investigations were G. S. Rice, J. J. Rutledge, R. Y. Williams, Charles Enzian, A. H. Fay, and H. I. Smith. The chief duties of the engineers are to go to mine disasters, to make investigations into their causes and prevention, and to assist in the mine rescue work, if needed in such work; to conduct investigation into the general safety conditions in mines as regards the use of explosives, methods of ventilation, gases present, the use of mining machinery, the conditions surrounding mechanical haulage, hoisting, and loading, the methods of mining with a view to greater safety; of timbering; of flushing or hydraulic filling methods such as are employed in the anthracite field of Pennsylvania, the investigation of spontaneous and other kinds of mine fires, and of any mining conditions that may affect safety and efficiency.

With a view to determining the character of the coal and the inflammability of the dust made in mining the coal, samples are collected of both the coal and the dust in each mine examined. Four to six samples of coal are collected by the methods adopted by the bureau at each of the mines visited. During the year a large amount of mine sampling was done, at the request of the Navy and the Panama Railroad, to obtain preliminary information necessary in the awarding of contracts. During the visit to the mine in which the sampling is being done the engineers gather general information regarding safety conditions of the mine.

Systematic mine-air sampling was done in Illinois, and in the hard and soft coal fields of Pennsylvania, in Alabama, and at all the various mines at which disasters have occurred as part of the general study of mine gases, and in some cases to enable the bureau to warn operators of dangerous conditions in their mines. Some of these samples, particularly in West Virginia and Alabama, were gathered

at the request of the State inspectors, to guide them in their official duties.

Many samples of coal dust were gathered in the mines of various States, their inflammability was tested, and the conditions surrounding the accumulation of dust in these mines were studied. Humidity observations were made in many of the mines with a view to ascertaining what effect a high or low percentage of humidity has in effectively wetting coal dust with a view to lessening its sensitiveness to ignition by the use of explosives or by electric arcs or grounds.

Attention was given to the relative quantities of dust produced by undercutting machines and the relative inflammability of dust from different parts of the same mine when mixed with different percentages of inert rock dust or clay.

Several mine fires were investigated, the methods of using stoppings were studied, and the gases given off by the fires were sampled and analyzed with a view to determining better methods of preventing or controlling mine fires.

A miners' circular dealing with the use of explosives in coal mining was prepared by J. J. Rutledge. A bulletin dealing with miscellaneous accidents in mines is being prepared for publication by J. J. Rutledge and other engineers, and a report on the relative efficiency of various kinds of stoppings in preventing leakage of the ventilating current in coal mines is being prepared by R. Y. Williams. A bulletin on the system of filling mine workings with waste by flushing, used in Pennsylvania anthracite mines, is being prepared by Charles Enzian.

G. S. Rice, chief mining engineer, supervised the mine investigations of the engineer; he also investigated a mine disaster in West Virginia.

During the absence of Mr. Rice in Europe, J. J. Rutledge, mining engineer, attended to the general work of mine investigations. Mr. Rutledge investigated a number of accidents during the year, as shown by the tabulation on pages 33-34. Mr. Rutledge also investigated the use of gasoline locomotives at a mine in Alabama, and headed a party that sampled coal mines in the Pocahontas and New River fields, West Virginia, for the Navy Department.

R. Y. Williams, mining engineer, with headquarters at Urbana, Ill., was chiefly occupied with the joint investigations carried on in Illinois by the State of Illinois and the Bureau of Mines, with a view to obtaining information that would tend to lessen accidents and waste in mining. Special attention was paid to the humidity of mines, coal dust and its inflammability, ventilation methods, leakage of stoppings, methods of timbering and mining, and fire protection and escape facilities. Mr. Williams also investigated mine disasters in Oklahoma.

Charles Enzian, mining engineer, with headquarters in Wilkes-Barre, Pa., was occupied chiefly with investigating flushing or hydraulic mine-filling methods in the anthracite field. He investigated a number of mine accidents, which are enumerated in the table on pages 33-34.

MINE-SAFETY WORK AND INVESTIGATIONS.

The chief work of the section of engineers, foreman miners, and first-aid miners of the mining division, which is under the direction of J. W. Paul, was the investigation of the causes of mine explosions and mine fires and the training of miners in the use of the methods and equipment employed in mine rescue work and in giving first aid to those injured in mine accidents. This work was carried on from the several mine-safety cars and stations. In addition, tests of miners' safety lamps and of mine rescue breathing and resuscitation apparatus were made at the Pittsburgh station and in the field.

Mining centers in all of the large coal-producing States were visited, and demonstrations, lectures, and training were given. Systematic training itineraries were arranged, involving stops of one, two, and three weeks at each place; during each stop classes of miners were given full courses of instruction and training in the use of mine rescue breathing apparatus and in first-aid work.

During the year the field work was conducted under an organization embracing six sections, over each of which an engineer had supervision. These sections were as follows:

Eastern section, including the coal-mining districts of Pennsylvania, Ohio, and West Virginia, cars 1 and 6 and the Pittsburgh station, in charge of J. W. Paul, assisted by J. T. Ryan and G. H. Deike, with headquarters at Pittsburgh, Pa.

Southern section, including the mining districts in Kentucky, Tennessee, Georgia, and Alabama, car 7, Knoxville and Birmingham stations, in charge of J. W. Paul, with headquarters at Pittsburgh, Pa.

Central section, including the coal-mining districts of Illinois, Indiana, Iowa, and Missouri, car 3, Urbana and McAlester stations, in charge of R. Y. Williams, with headquarters at Urbana, Ill.

Southwestern section, including Kansas, Arkansas, and Oklahoma, McAlester station, in charge of C. S. Stevenson, with headquarters at Pittsburg, Kans.

Southern Rocky Mountain section, including the coal-mining districts of southern Wyoming, Utah, Colorado, and New Mexico, cars 2 and 4, in charge of J. C. Roberts, with headquarters at Denver, Colo.

Pacific section, including coal and metal mines in Washington, Idaho, Montana, and north Wyoming, car 5 and Seattle station, in charge of H. M. Wolfen, with headquarters at Billings, Mont.

Following are tabulations showing mines visited for investigative and mine-recovery work, record of operation of each mine-safety car, and record of demonstration and instruction at mine-safety cars and stations. In some instances the mine listed was visited by engineers or chemists of the bureau not constantly employed in mine-safety work.

Mines visited for investigative and mine-recovery work.

Date.	Name of mine.	Location.	Operating company.	Nature of accident.	Visited by—
1911. July 16....	Sykesville.....	Sykesville, Pa...	Cascade Coal & Coke Co.	Explosion.....	H. M. Wilson, J. C. Roberts, C. S. Stevenson, W. D. Roberts, W. A. Raudenbush, W. Burke, G. A. Burrell, F. M. Seibert, H. I. Smith, J. T. Ryan, and safety car 7.
Aug. 16....	Standard Pocahontas.	Welch, W. Va..	Standard Pocahontas Fuel Co.	do.....	J. T. Ryan.
Aug. 23....	Giroux.....	Ely, Nebr.....	Giroux Consolidated Mines Co.	Explosion, fire..	H. M. Wolfkin.
Aug. 30....	Stone Quarry...	Harlan, Ky.....	West Connecticut Iron & Steel Co.	Explosion.....	A. A. Sams.
Sept. 9....	Somerset.....	Somerset, Colo..	Utah Fuel Co...	Fire.....	J. C. Roberts, T. C. Harvey, and safety car 2.
Sept. 16....	Star.....	Leadville, Colo..	Star Consolidated Mining Co.	Cave-in.....	J. C. Roberts.
Oct. 19....	Hibernia.....	Wharton, N. J..	Wharton Steel Co.	Flooded workings.	Chas. Enzian.
Oct. 20....	Busby No. 5....	Krebs, Okla....	Osage Coal & Mining Co.	Explosion.....	A. G. Hamilton.
Oct. 22....	Black Top.....	Lore City, Ohio.	Morris Coal Co..	Fire.....	Wm. Burke and safety car 7.
Oct. 30....	O'Gara No. 9....	Harrisburg, Ill.	O'Gara Coal Co..	Explosion.....	H. I. Smith.
Nov. 4....	Fort Branch....	Fort Branch, Ind.	Fort Branch Coal & Mining Co.	do.....	A. A. Sams, G. T. Powell, and safety car 3.
Nov. 4....	Brewer No. 1....	Brewer, Okla...	Brewer Coal & Mining Co.	Fire.....	A. G. Hamilton.
Nov. 7....	Needmore shaft.	Ovonoga, Mo....	Ovonoga Mining & Development Co.	Shaft closed by collapse.	J. C. Roberts.
Nov. 9....	Adrian No. 1....	Delancey, P. a. (Punxsutawney).	Rochester & Pittsburgh Coal & Iron Co.	Explosion.....	J. J. Rutledge, G. A. Burrell, J. T. Ryan, W. A. Raudenbush, C. O. Roberts, W. T. Burgess, and safety car 6.
Nov. 14....	Cherry Valley No. 2.	Cherry Valley, Pa.	Pittsburgh & Eastern Coal Co.	Fire.....	O. H. Reinhold, W. D. Roberts, W. A. Raudenbush, and C. O. Roberts.
Nov. 18....	Bottom Creek...	Vivian, W. Va..	Bottom Creek Coal & Coke Co.	Explosion.....	H. I. Smith, and J. T. Ryan.
Nov. 20....	Osage No. 5....	McAlester, Okla.	Osage Coal & Mining Co.	do.....	A. G. Hamilton, W. T. Burgess, and R. Y. Williams.
Dec. 2....	Auchincloss....	Nanticoke, Pa..	Delaware, Lackawanna & Western R. R. Co.	do.....	D. D. Davis and W. J. German.
Dec. 5....	Busby No. 6....	Busby, Okla....	Osage Coal & Mining Co.	do.....	W. T. Burgess.

Mines visited for investigative and mine-recovery work—Continued.

Date.	Name of mine.	Location.	Operating company.	Nature of accident.	Visited by—
1911. Dec. 9.....	Cross Mountain.	Briceville, Tenn.	Knoxville Coal & Iron Co.	Explosion	J. A. Holmes, J. W. Paul, J. J. Rutledge, J. T. Ryan, Wm. Burke, John Ferrell, C. O. Roberts, W. A. Raudenbush, E. A. Sutton, A. R. Brown, and safety cars 6 and 7.
1912. Jan. 6.....	Parrish.....	Plymouth, Pa.	Parrish Coal Co.	do.....	Chas. Enzian, J. J. Rutledge, and D. D. Davis.
Jan. 10.....	No. 8 mine.....	Hartshorne, Okla.	Rock Island Coal Co.	do.....	W. T. Burgess.
Jan. 16.....	Country Bank.....	New Castle, Pa.	Central Coal & Coke Co.	Cave-in.....	John Ferrell.
Jan. 17.....	Central.....	Central City, Ky.	Central Coal & Coke Co.	Explosion.....	C. S. Stevenson.
Jan. 19.....	Cherry Valley No. 2.	Cherry Valley, Pa.	Pittsburgh & Eastern Coal Co.	Fire.....	J. W. Paul, J. T. Ryan, H. I. Smith, John Ferrell, G. H. Deike, J. T. Reynolds, F. M. Seibert, W. A. Raudenbush, and C. O. Roberts.
Jan. 20.....	Kemmerer.....	Susie, Wyo.....	Kemmerer Coal Co.	Explosion.....	J. C. Roberts, Jesse Henson, G. W. Salisbury, and safety car 4.
Jan. 27.....	Keystone.....	Shelburn, Ind.	Gregory Coal & Mining Co.	do.....	C. S. Stevenson.
Feb. 1.....	do.....	do.....	do.....	do.....	Do.
Feb. 1.....	Electric.....	Danville, Ill.	Electric Mining Co.	Fall of cage.....	Do.
Feb. 12.....	Dow No. 2.....	Dow, Okla.	Milby Dow Coal Co.	Fire.....	W. T. Burgess.
Feb. 14.....	Brewer No. 3.....	Brewer.....	Southern Fuel Co.	Explosion and fire.....	Do.
Feb. 23.....	Busby No. 2.....	Busby, Okla.	Great Western Coal & Mining Co.	Explosion.....	Do.
Feb. 23.....	Standard.....	Mace, Idaho.....	Federal Mining & Smelting Co.	Fire.....	J. W. Anderson and safety car 5.
Mar. 20.....	Sans Bois No. 2.	McCurtain, Okla.	Sans Bois Coal Co.	Explosion.....	J. J. Rutledge, W. T. Burgess, R. Y. Williams, Jesse Henson, C. S. Stevenson, C. W. Salisbury, and safety car 4.
Mar. 26.....	Jed.....	West Virginia.	Jed Coal & Coke Co.	do.....	G. S. Rice, J. W. Paul, W. A. Raudenbush, C. O. Roberts, Wm. Burke, J. T. Reynolds, D. D. Davis, G. H. Deike, and safety cars 6 and 7.
Apr. 12.....	Busby No. 5.....	Busby, Okla.	Osage Coal & Mining Co.	do.....	W. T. Burgess.
Apr. 21.....	Coll.....	Madisonville, Ky.	Coll Coal Co.	do.....	A. A. Sams and E. B. Sutton.
Apr. 29.....	Marvel.....	Marvel, Ala.	Roden Coal Co.	do.....	J. J. Rutledge.
June 18.....	Hastings.....	Hastings, Colo.	Carbon Coal & Coke Co.	do.....	J. C. Roberts, K. H. Chisholm, and W. D. Schofield.

Record of operation of each mine-rescue car.

Car.	Days in operation.	Days not in operation.	Included in period of idleness.
No. 1.....	118	248	Time car was laid up at Wilkes-Barre, in shops for repairs, and at experimental mine.
No. 2.....	228	138	Time car was laid up in shops for repairs and at Rock Springs, Wyo.
No. 3.....	144	222	Time car was undergoing repairs and laid up at Knoxville, Tenn.; also time idle at Evansville, Ind.
No. 4.....	260	106	Time car was laid up at headquarters (Rock Springs, Wyo., and Pittsburg, Kans.) and in repair shops.
No. 5.....	282	84	Time car was laid up at headquarters during winter.
No. 6.....	155	211	Time car was laid up at headquarters and in repair shops and at experimental mine.
No. 7.....	221	145	Time car was laid up at Pittsburgh, Pa., and at headquarters.
Total.....	1,408	1,154	
Average of each car.	201½	164½	

Record of demonstration and instruction at mine-rescue cars and stations during the fiscal year.

Car or station.	Visitors.	At lectures.	Wearing apparatus.	Given partial training.		Certificates authorized.	Certificates issued.	Combination certificates issued. ^a
				Rescue.	First aid.			
Car:								
No. 1.....	4,943	1,850	389	243	300	132	156	80
No. 2.....	14,258	6,675	434	339	3,603	63	241	91
No. 3.....	8,249	3,030	1,001	133	909	44	67	.....
No. 4.....	11,089	4,739	787	274	2,135	57	80	6
No. 5.....	9,623	2,560	1,323	287	955	234	156	14
No. 6.....	2,737	5,097	145	137	643	116	124	1
No. 7.....	8,119	9,179	138	164	220	100	121	.....
Stations:								
Pittsburgh, Pa.....	2,403	405	126	69	49	16	20	2
Urbana, Ill.....	327	1,525	46	24	89	10	19	24
Knoxville, Tenn.....	242	495	35	23	27	17	13	.....
McAlester, Okla.....	753	238	101	51	57	20	25	.....
Seattle, Wash.....	721	.....	133	112	202	121	67	17
Birmingham, Ala.....	197	650	113	25	13	16	21	.....
W. D. Boonfield, at Trinidad, Colo.....	.....	.....	.....	15	130	.....	.....	.....
Total.....	63,631	36,443	4,771	1,896	9,332	946	1,110	234

^a Covered proficiency in both mine-rescue and first-aid work and replaced certificates previously granted or mine-rescue training only.

WORK AT THE MINE-RESCUE STATIONS.

At the Pittsburgh station J. W. Paul, mining engineer, had supervision of the work of training miners in rescue and first-aid methods, and the supervision of the tests of safety lamps and breathing apparatus. In addition, he was engaged in the preparation of publications dealing with mine safety. J. T. Ryan, assistant mining engineer, had direct charge of the testing of safety lamps. He was also engaged in testing and repairing rescue apparatus, and for part of the year had general charge of training work at the Pittsburgh station. G. H. Deike and O. H. Reinholt, assistant mining engineers, and D. J. Price, foreman miner, assisted during parts of the year in making

tests of lamps and other apparatus, and in preparing reports, statements, and estimates. W. D. Roberts, foreman miner, and C. O. Roberts, first-aid miner, gave mine-rescue and first-aid training, and repaired apparatus, lamp equipment, etc.

In addition to the foreman miners and first-aid miner located at Pittsburgh as named above, K. H. Chisholm, C. S. Stevenson, J. M. Anderson, A. R. Brown, William Burke, D. D. Davis, Jesse Henson, W. A. Raudenbush, A. A. Flynn, J. M. Webb, W. T. Burgess, E. B. Sutton, A. A. Sams, and A. G. Hamilton, foreman miners, and W. D. Scofield, G. W. Salisbury, W. J. German, Leonard Farnell, J. T. Reynolds, T. C. Harvey, and G. T. Powell, first-aid miners, were in charge of, or engaged in the work of, the mine-safety cars and stations for various periods of time during the year.

John Ferrell, first-aid miner, was killed in line of duty January 19, 1912, while exploring an inclosed fire area at Cherry Valley mine, Pennsylvania.¹

INVESTIGATIONS AT THE EXPERIMENTAL MINE.

The primary purpose of the experimental mine at Bruceton, Pa., near Pittsburgh, is to enable explosions of coal dust and gas to be made on a scale comparable with ordinary mine explosions, which is not possible in a surface gallery because of the latter not being strong enough to resist rupture. Further, a mine presents special conditions, such as the coal walls, the slate roof, and the irregular timbering, which can not well be duplicated in a gallery of wood, steel, or concrete. Hence, preventive means that are successful under the artificial conditions in a surface gallery are not necessarily successful in a mine. This inference is supported by the result of experiments that have been conducted in surface galleries in different countries.

The arrangements at the experimental mine at Bruceton make possible the duplication of any kind of explosion that may be experienced in a coal mine.

In this mine, moreover, other investigations relating to safety can be made, such as tests of gasoline locomotives, of mining or cutting machinery, of permissible and nonpermissible explosives, of electrical apparatus, and of ventilating methods.

During the early part of the fiscal year the entries were driven 740 feet from the outcrop, the total length of single entry being about 1,700 feet. The first large test of the explosibility of coal dust under natural mine conditions was made on October 24, 1911. The mine headings had been loaded with only 1 pound of coal dust per linear

¹Mr. Ferrell was the second of the rescue miners employed in the Bureau of Mines to lose his life while wearing artificial breathing apparatus in a mine containing irrespirable mine gases. The first was Joseph E. Evans, who was overcome in the Pan-coast coal mine, near Scranton, Pa., April 7, 1911, while endeavoring to rescue miners caught in the mine by the disastrous mine fire of that date.

foot of entry, and only 2 pounds of black powder, a quantity much less than ordinarily used in mine blasting, was used in charging the blown-out shot that started the explosion, yet the explosion was so violent that it broke the concrete lining in places.

On October 30, 1911, a public test was made as part of the national mine-safety demonstration at Pittsburgh; over 1,200 mining men examined the mine prior to the explosion, and watched the demonstration. The flames issuing from the mine lit up the country around, and the noise was heard for a number of miles.²

Other tests were made during the winter, and on February 24, 1912, a very violent explosion was witnessed by a large assemblage of mine inspectors, operators, and miners. The enormous speed of over 2,000 feet per second was attained by the explosive wave, and pressures of over 100 pounds per square inch were recorded.

After the test of February 24 experiments were made with gasoline locomotives and explosives, supplementing the work at the Pittsburgh station. In May and June the foreman miners and first-aid miners who were unable to continue the mine rescue and first-aid training at the cars and stations because of lack of funds were sent to the experimental mine to drive the entries and to test explosives. On June 30 the main entry and the air course were in 978 and 980 feet, respectively, making a total of about 2,200 linear feet of single entry.

Plans for the fiscal year 1912-'13 include work of further enlargement of the mine to make it more like a commercial mine and tests of preventive means for stopping or checking explosions.

The chief results of the explosion experiments for the past year are as follows:

(1) The mining public has been convinced that coal-dust explosions can be produced at will in a mine as well as in a gallery.

(2) Coal-dust explosions may be caused by relatively small quantities of long-flame explosives in an unsafe shot which expends its energy outside the hole.

(3) Violent coal-dust explosions may be produced in a comparatively short distance; that is, 600 or 700 feet. This is a matter of much importance since it indicates the necessity of trying to prevent explosions from starting rather than trying to check them after being started.

A detailed report of all the experiments of the first series has been prepared for publication in the near future.

The experimental mine has been under the general direction of George S. Rice, chief mining engineer; L. M. Jones, mining engineer, and H. C. Howarth, mine foreman, have been in immediate charge

² The details of this test are described in a chapter by G. S. Rice in Bulletin 44, Bureau of Mines, 1912.

of the mine and the preparation for the experimental tests; J. K. Clement, physicist, and his assistant, W. L. Egy, assistant physicist, have been in charge of the instruments and the records therefrom.

INFLAMMABILITY OF COAL DUST.

The laboratory study of the comparative inflammability of coal dust from various parts of the United States and of the factors that affect the inflammability of the dust is being continued in the laboratory at Pittsburgh. These experiments supplement the results of the tests on a large scale made in the explosives galleries and at the experimental mine and are of much value in bringing out the relative importance of different conditions affecting dust explosions in coal mines.

At the Pittsburgh experiment station inflammability tests were made also for a number of other coals, including some foreign coals. In all, some 35 coals were tested, involving approximately 500 determinations. During the year the manuscript and illustrations of a bulletin on the inflammability of coal dusts were prepared and submitted for publication.

The laboratory investigations at Pittsburgh were in charge of J. C. W. Frazer, chemist, from July 1 to September 1, 1911, and of E. J. Hoffman, assistant chemist, from July to December 1, 1911.

In cooperation with the State of Illinois, for the period January 1 to June 30, 1912, investigations of the inflammability of dusts from Illinois coal mines were undertaken at Urbana.

The laboratory study of the inflammability of face samples of coal and of rib-dust and road-dust samples powdered to pass through a 200-mesh screen taken from the mines of two Illinois mining districts, 6 and 8, was completed. In these districts are 19 mines, from which over 100 samples of coal were tested.

A series of experiments was made to determine the effect of commercial common salt (sodium chloride) when powdered and mixed with coal dust upon the inflammability of the dust. Mixtures of Pittsburgh standard dust containing, respectively, 15, 30, and 45 per cent of salt were tested.

It is expected that from the study of the inflammability of the road-dust and rib-dust samples a comparison may be made as to the relative possibility of such dusts propagating a large explosion, and that through the investigation of the composite face samples from the 100 mines it will be possible to throw light upon the different coals in the State of Illinois with respect to the relative inflammability of their dusts.

In connection with the investigation of the inflammability of the coals from the various districts in the State, it is proposed to study the effect of the addition of shale dust in reducing the inflamma-

bility of coal dust, the determination of the quantities of shale dust necessary to render the coal dust nonexplosive, and the effect of the presence of small percentages of gas (methane) upon the inflammability of coal dust.

The mining investigations show that Illinois coal dusts form explosive mixtures, that explosions are rare in the northern part of the State, where there is much shale dust in the mines, and frequent in the southern part of the State, where small quantities of methane are present in the mines.

The work of the bureau in these laboratory investigations is in charge of J. K. Clement, physicist. L. A. Scholl, jr., junior chemist, conducts at Urbana the laboratory inflammability tests that form a part of the cooperative work with the State of Illinois.

OCCURRENCE OF MINE GASES.

In cooperation with the State of Illinois, and in continuation of the study of the geologic conditions governing the occurrence of explosive gas in mines, an investigation of some conditions under which such gas occurs in coal mines in southern Illinois was undertaken. The area selected lies south of a line passing through Duquoin, Benton, and Eldorado. Field work was begun the first week in January, after conference with the State geological survey at Urbana. All the representative mines were visited, many of them a number of times, and more than 200 samples of return air were collected. These samples were analyzed in the laboratory at the Pittsburgh station. Special consideration was given to the influence of rock structure and other geologic conditions on the occurrence of gas, and most of the sampling was so conducted as to permit the comparison of the total volumes of inflammable gas coming from different sections of a mine as well as from the main return.

Sampling at different times gave opportunity for comparing variations in the quantity of gas evolved, notably after the mines were idle for several weeks during a suspension of mining. A series of tests was made to determine the pressure of the gas in the solid coal in various mines and in several parts of the same mine by boring 10-foot holes into the coal and placing in each a pipe tightly tamped for 7 feet of its length. The pressure was determined at different times and under different conditions by a pressure gage on the pipe, and in some instances the volume of gas escaping was measured. A few samples of pure gas from these test holes were collected for analysis, and samples of some of the borings were sent to Pittsburgh at weekly intervals to be tested for the quantity of gas given off. Some of these samples were taken separately at depths of 4, 8, and 10 feet in boring the test holes.

Somewhat more than three months was devoted to the field work, and then the assembling of the data was begun. Considerable progress was made in calculating the area of coal exposed in parts of mines tested, and the preparation of a base map was commenced.

This investigation was conducted by N. H. Darton, geologist.

CHEMICAL INVESTIGATIONS OF MINE GASES AND OF NATURAL GAS.

The work of the year included the collection and analysis of samples of mine gases and natural gas and the study of problems relating to mine safety or the utilization of natural gas.

Other work included chemical supervision of the gas-air mixtures used at the Pittsburgh station for testing explosives, safety lamps, electric lamps, etc.; this involved making fully 2,000 analyses of these mixtures. In addition, some chemical tests were made of the air and oxygen supply of breathing helmets while in use.

Trips were made to a number of mines, some of them after explosions had occurred, in order to gain reliable information regarding conditions.

In connection with the several investigations carried on, the methods used for sampling and analyzing mine gases were improved.

One hundred samples of natural gas were collected in the course of an investigation of the composition of natural gas in different parts of the country and of the possibility of using the gas for making gasoline.

Mine inspectors and persons directly interested in mine safety frequently send in samples of mine air for examination. The examination of such samples is considered important, in that the senders are furnished accurate analyses, and are enabled to take proper action in providing against possible danger to life or property. Simple apparatus have been developed which make such local tests easy and inexpensive, so that mine owners can install at their mines facilities for making such tests of gases from day to day as may be needed.

One thousand mine-gas samples were analyzed, including 300 samples collected by N. H. Darton in Illinois and 300 samples collected in the anthracite fields of Pennsylvania, and many were collected in investigations following mine explosions, under the direction of G. S. Rice, in order to assist in determining the cause of each explosion.

One hundred and fifty samples of normal mine atmospheres were collected.

One hundred and twenty-five samples of mine air vitiated by the exhaust of gasoline locomotives, including samples from the exhaust of such locomotives, were collected to determine the cause of the production of harmful gases in the exhaust. A special study of carbureter construction was made.

Eighty samples of mine air were analyzed in connection with the investigations of the vitiation of mine air by blasting. Thirty samples of mine air were collected at the experimental mine in the course of experiments on the explosibility of coal dust.

Assistance in establishing mine-gas laboratories was rendered the following:

State mine-inspection department of Alabama; State mine-inspection department of Tennessee; State mine-inspection department of West Virginia; Roane Coal & Iron Co., Rockwood, Tenn.; Tidewater Coal Co., Vivian, W. Va.; Lehigh Coal & Navigation Co., Lansford, Pa.; Westmoreland Coal Co., Greensburg, Pa.; Pittsburgh-Buffalo Coal Co., Pittsburgh, Pa.; Ellsworth Coal Co., Ellsworth, Pa.; Federal Coal Co., Granttown, W. Va.; and Tennessee Coal & Iron Co., Birmingham, Ala.

Twelve plants making gasoline from natural gas were visited in the course of a study of gasoline manufacture.

The plans for 1912-13 include investigations of atmospheric conditions in different mines, the supervision of gas-air mixtures used in testing explosives or mine equipment, the collection of data bearing on the explosibility and the physiologic action of mine gases and of noxious and explosive gases formed by blasting, and also investigations relating to the use of gasoline locomotives and acetylene lamps, and the control of fire damp in coal mines.

In addition, attempts will be made to separate natural gas into its separate paraffin hydrocarbons by liquefaction and fractionation, and the extraction of gasoline from natural gas will be further studied.

Technical Papers 10, 11, and 13 were issued during the year. A technical paper entitled "Gas-Analysis Laboratories for Coal Mines" was submitted for publication, also a bulletin entitled "Methods and Apparatus for the Examination of Mine Gases and Natural Gas." Work was done on a bulletin having to do with the composition of mine atmospheres, also on a technical paper dealing with the exact analysis of gases by combustion, and a technical paper entitled "Apparatus for Exact Flue-Gas Analysis." Work was begun on a bulletin dealing with the composition of the natural gas in the United States and on three technical papers dealing, respectively, with black-damp in mine air, inflammable gases in mine air, and the adaptability of natural gas to gasoline manufacture. In addition, a miners' circular on mine gases is in course of preparation.

The natural-gas and some of the mine-gas investigations described above were in charge of G. A. Burrell, assistant chemist, who was aided by F. M. Seibert and L. D. Belden, junior chemists. G. S. Rice was in charge of and responsible for the initiation of some of these mine-gas investigations. O. P. Hood was in charge of the work concerning gasoline locomotives.

INVESTIGATIONS OF EXPLOSIVES USED IN MINING.

PHYSICAL TESTS OF EXPLOSIVES.

The bureau makes physical tests of explosives to determine the safety and efficiency of the explosives for use in coal mines where, from the presence of inflammable gases or coal dust, the conditions are unfavorable to safety.

In accordance with the provisions of an act of Congress, fees covering actual costs were charged for tests made for manufacturers of explosives. After a careful consideration of "the actual necessary expenses" involved in testing explosives, the Secretary of the Interior approved the following schedule of fees, which became effective July 1, 1911:

Fees for testing explosives.

For a complete official test of each explosive to determine its permissibility for use in coal mines.....	\$150
In case of the failure of an explosive to pass a complete official test.....	75
For three propagation tests of a permissible explosive with different diameters of cartridge from that originally submitted for test.....	15
For three experimental shots in ballistic pendulum.....	15
For each experimental shot in gallery:	
Test 1.....	5
Test 3.....	5
Test 4.....	15

During the year 52 explosives were submitted for tests to determine their permissibility for use in coal mines; 32 of these passed the required tests and were placed on the permissible list; 18 failed to pass the required tests, and the tests on 2 explosives were not completed prior to July 1. Nine special experimental shots were made with the ballistic pendulum and three experimental shots (test 4) were made in gallery No. 1 for manufacturers. The total sum collected for the above tests was \$6,240.

On July 1, 1911, there were 88 explosives on the "permissible list" established by the bureau. During the year 32 explosives were added to the list and 25 explosives were withdrawn for the reason that they were no longer being manufactured or had shown unfavorable results in field tests. Many of the explosives withdrawn had been replaced by others more suitable. On June 30, 1912, there were 95 explosives on the "permissible list." The tests of explosives during the year included the following:

Examinations and tests of explosives.

Physical examination.....	115
Trauzl lead blocks.....	204
Small Trauzl lead blocks.....	58
Small lead blocks.....	478
Calorimeter.....	246

Rate of detonation.....	482
Rate of detonation (special).....	25
Flame test.....	206
Gas and dust gallery No. 1.....	1, 527
Forbes Field gallery.....	11
Gas and dust gallery No. 3.....	3
Ballistic pendulum.....	467
Small impact machine.....	52
Large impact machine.....	40
Explosion by influence.....	425
Rate of burning.....	31
Pressure gage No. 1.....	225
Pressure gage No. 2.....	371
Cone friction device.....	6
Pendulum friction device.....	80
Separation tests.....	2
Miscellaneous, calibrations, etc.....	206
Total.....	5, 280

The following devices were installed at the experiment station during the fiscal year: A large impact machine for determining the sensitiveness of explosives in comparatively large quantities (20 grams); a pendulum friction device and a cone friction device for determining the sensitiveness of explosives to friction; a cement-mortar thaw house for demonstrating a proper method of thawing explosives; and a cement-mortar magazine for daily use and for showing good practice in the storage of explosives.

Informal tests to demonstrate the safety features of permissible explosives were continued during the year; they were witnessed by various organizations and persons, as follows:

Rivers and Harbors Committee of the House of Representatives, July 21, 1911.

Pittsburgh Coal Operators' Association, September 8, 1911.

Westinghouse Club, of Wilkensburg, Pa., October 14, 1911.

D. C. Botting, Washington State inspector of mines; Robert Strachn, British Columbia, Canada, and other visitors from Canada, November 3, 1911.

Ohio Society of Mechanical, Electrical, and Steam Engineers, May 14, 1912.

The following special tests were completed during the fiscal year:

(1) Test for Ordnance Department, Frankford Arsenal, Philadelphia, Pa., of a stick of explosive found in coal received by the War Department.

(2) Tests at Johnetta mine, White Rock, Pa., with three permissible explosives to determine the amount of noxious gases evolved on detonation.

(3) Tests of thaw house at Pittsburgh experiment station to demonstrate its practicability.

(4) Special tests at Banning mine, Whitsett, Pa., to determine the efficiency of permissible explosives.

(5) Inspection of work of the United States Engineer Office at Lock No. 1, Monongahela River, Pittsburgh, Pa., December 19, 1911, to assist in determining the cause of the failure of shots.

(6) Special tests on subaqueous blasting, made on behalf of the United States Engineer Office, to determine the most suitable explosive for such work,

(7) Special tests with fuse to determine whether the makers complied with the specifications of the Isthmian Canal Commission.

(8) Special tests with 40 per cent "straight," 40 per cent strength low-freezing, 40 per cent strength ammonia, and 40 per cent strength gelatin dynamites, and other explosives used in engineering and mining operations to determine their safety and efficiency in use.

(9) Special tests with slag dust to determine its value as a preventative of coal-dust explosions.

(10) Investigations of detonators and electric detonators to determine their relative efficiency.

(11) Special tests to determine the heat evolved in manure piles and the practicability of using manure for thawing explosives.

The following special tests were commenced during the year:

(1) Tests to determine the efficiency of shot-firing machines.

(2) Special tests with black powder for the Illinois Powder Commission.

(3) Special tests with seven foreign explosives to determine their relative safety in United States and in foreign practice.

(4) Special friction tests to determine the relative safety of explosives in charging drill holes.

(5) Tests of the sensitiveness of explosives to determine their relative safety in handling, transportation, and use.

The increasing sales of permissible explosives (the sales amounted to 13,428,000 pounds in 1911) indicate the greater interest in mine safety that has resulted from the experimental and educational work carried on by the bureau. The death rate in coal mines in which permissible explosives are used shows a decrease, and a steady reduction of accidents in the coal mines of this country will result from the greater use of these explosives.

The following publications, prepared wholly or in part by the engineer in charge of the physical tests of explosives and his assistants, were issued during the year: Bulletin 10, Bulletin 15, Technical Paper 7, and Miners' Circular 6. A bulletin entitled "Selection of Explosives for Use in Engineering and Mining Operations" and a technical paper entitled "Magazines and Thaw Houses for Explosives" were submitted for publication.

The work described above was in charge of Clarence Hall, explosives engineer. He was aided by S. P. Howell, assistant engineer; A. J. Hazlewood, assistant engineer (resigned Jan. 15, 1912); A. B. Coates, assistant engineer (resigned Aug. 31, 1911); H. F. Braddock, junior chemist; C. A. Lambert, junior chemist (resigned Sept. 15, 1911); J. W. Koster, junior engineer (from Sept. 19, 1911); H. I. Smith, junior engineer (Sept. 14, 1911, to Oct. 14, 1911); A. J. Strane, junior engineer (from Oct. 2, 1911); I. W. Robertson, junior chemist (from Oct. 2, 1911, to Dec. 16, 1911); A. S. Crossfield, junior chemist (from Dec. 11, 1911); J. E. Tiffany, junior engineer (from Jan. 16, 1912); Charles Schuler and Carl Muhnkarn, shot-firers.

CHEMICAL ANALYSES OF EXPLOSIVES.

The routine work of analyzing explosives submitted for test is carried on by the explosives chemical laboratory. During the fiscal year the following work was done by this laboratory:

Work of the explosives chemical laboratory.

Analyses:

Dynamite	388
Mining explosives	109
Black powder	9
Electric detonators	30
Blasting caps	22
Products of combustion of mining explosives	61
Railroad torpedoes	4

Determinations:

Nitroglycerin in explosives	58
Nitrosubstitution compounds	10
Solubilities of nitrosubstitution compounds (experimental)	64
Moisture in explosives (experimental)	118
Nitrogen in nitroglycerin (experimental)	39
Nitrogen in other explosives (experimental)	28
Fulminate of mercury (experimental)	34
Sulphur in black powder (experimental)	9

Tests of wood pulp	6
Physical tests of electric detonators	2,904
Physical tests of railroad torpedoes	25
Exudation tests of dynamite (centrifugal method)	1,418
Stability tests (heat tests) of explosives	136
Decomposition tests of nitroglycerin (experimental)	45
Analyses, determinations, and tests not included above	210

Total analyses, tests, and determinations	5,727
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The work of inspecting explosives for the Isthmian Canal Commission required the equivalent of the time of one man for 380 days, approximately as follows: Analyses and tests of dynamite, 350 days; analyses and tests of electric detonators and blasting caps, 30 days.

During the year Technical Papers 6 and 12 were published. A bulletin on the analysis of black powder and dynamite, by W. O. Snelling and C. G. Storm, and a technical paper on the effect of stemming in increasing the efficiency of explosives, by W. O. Snelling and Clarence Hall, were submitted for publication. Considerable progress was made on a paper on the exudation of nitroglycerin from dynamite and similar explosives, by W. O. Snelling, and a large amount of data was obtained for use in the preparation of a bulletin on the analysis of permissible explosives.

In connection with the preparation of the papers on methods of analyzing explosives a number of new methods were developed and existing methods were improved.

At the beginning of the fiscal year W. O. Snelling, chemist, was in charge of the laboratory, with C. G. Storm, explosives chemist, as assistant. The other chemists employed were A. L. Hyde, assistant chemist; W. C. Cope, assistant chemist; C. A. Taylor, junior chemist (resigned November 11, 1911); J. H. Hunter, junior chemist; J. E. Crawshaw, junior chemist (from December 15, 1911). On January 1, 1912, W. O. Snelling was made consulting chemist in charge of special researches and C. G. Storm was placed in charge of the laboratory.

SPECIAL INVESTIGATIONS OF EXPLOSIVES.

Until January 1, 1912, the chemical analysis of explosives and special researches relating to the chemistry of explosives were carried on together, under the charge of W. O. Snelling, chemist. On January 1, 1912, in order to insure better facilities for research work, all research work in explosives was transferred to W. O. Snelling as consulting chemist. Accordingly, the research work that was done up to January 1, 1912, will be found under the report of the explosives chemical laboratory, and only the research work that has been done since is reported here.

A number of tests have been made with a new methane indicator. This investigation, which is now in progress, promises an instrument that, it is hoped, may prove of decided value in mining work. One form of the device, to be placed in any desired part of a mine, records at any convenient spot the percentage of gas (methane) in the mine atmosphere; another type is portable, and is intended to take the place of the mine lamp as an indicator of the percentage of gas (methane) in the atmosphere.

Tests are being made on a substitute for the Abel test for stability of explosives, and a preliminary paper covering this new method has been submitted for publication.

A number of other investigations are in progress, particularly those in connection with the exudation of nitroglycerin from explosives, and the action of explosives on rocks of different physical characteristics.

ELECTRICAL INVESTIGATIONS.

The electrical investigations of the Bureau of Mines are particularly concerned with inquiries that relate to safeguarding life and property from the dangers that attend the use of electricity in mining and metallurgical plants.

The principal investigations conducted at the Pittsburgh station were an investigation of the protection afforded by different types of safety switches against the ignition of inflammable gas in mines; an investigation of the ignition of fire damp by the filaments of in-

candescant lamps when the bulbs of the lamps are broken in the presence of fire damp (completed in June, 1912); an investigation of the action of acid water upon the insulation of electric conductors (not yet complete); and an investigation of the effectiveness of explosion-proof casings for motors in preventing ignition of inflammable gas outside the motor by sparks generated within the casing (completed in November, 1911).

Miscellaneous work included the development of an electrically driven centrifugal humidifier for moistening mine air, work on an electric pressure indicator for use at the experimental mine, work on an electrical device for detecting gas (methane) in mines, the development of a system of symbols for representing electrical apparatus on mine maps, preliminary tests of portable electric lamps for mine use, tests in connection with an electrically heated thaw house, and electrical work at the experimental mine.

The following table shows the number of tests and observations made during the year:

Tests and observations of the electrical section of the Bureau of Mines.

Nature of test.	Number of tests.	Number of observations.
Investigation of mine safety switches (158,168 switch operations).....	141	2,797
Incandescent-lamp tests.....	1,274	8,580
Action of mine water on electrical insulation.....	420	2,980
Explosion-proof motors.....	180	4,230
Electrically heated thaw house.....	18	2,505
Electric pressure indicator for experimental mine.....	28	2,409
Centrifugal humidifier.....	1	150
	2,062	23,611

During the year Technical Paper 19 was published by the bureau. Bulletin 46, "An Investigation of Explosion-Proof Motors," by H. H. Clark, was submitted for publication, as were Technical Paper 22, "Electrical Symbols for Mine Maps," by H. H. Clark, and Technical Paper 23, which gives the results of tests on the ignition of gas with miniature incandescent lamps, and Technical Paper 28, which gives the results of tests of the ignition of gas by standard-size incandescent lamps.

The electrical investigations of the bureau were in charge of H. H. Clark, electrical engineer; L. C. Ilsley, assistant electrical engineer; and R. W. Crocker, junior electrical engineer.

PHYSICAL INVESTIGATIONS.

The physical laboratory at the Pittsburgh experiment station has charge of the operation of the physical apparatus and instruments used in the investigations of coal-dust explosions at the experimental

mine. Special instruments are being developed for recording the pressure in explosions and for taking samples of the gases during an explosion in a mine. The operation of instruments used at the mine was in charge of W. L. Egy. Experiments in connection with the design of new apparatus were conducted by W. L. Egy and L. V. Walker.

The laboratory is at present occupied chiefly with investigations concerning the causes of mine explosions. An investigation of the influence of carbon dioxide (CO_2) on the explosibility of mine gases was concluded. From the results diagrams have been prepared with which one may readily determine from an analysis of a sample of a mine atmosphere whether the sample represents an explosive mixture.

The laboratory also tested and repaired various kinds of apparatus and instruments used in the bureau's investigations, including rheostats, storage batteries, millivoltmeters, ammeters, galvanometers, thermocouples, optical pyrometers, and thermometers.

The laboratory is in charge of J. K. Clement, with the following assistants: W. L. Egy, assistant physicist; L. V. Walker, assistant physical chemist, temporary (appointed Jan. 6, 1912); F. F. Rupert, jr., physical chemist (appointed June 6, 1912); L. A. Scholl, jr., junior chemist (stationed at Urbana, Ill., since November, 1911); F. H. Ramsey, junior chemist (resigned Oct. 6, 1911).

CORROSION OF IRON AND STEEL IN MINE EQUIPMENT.

One of the investigations connected with efficiency in mining that the bureau has undertaken is the development of a method for preventing the corrosion of iron and steel used in mine equipment, as pumps, pipes, and beams, by acid water from mines. In these experiments the effect of a number of factors influencing the rate of corrosion was investigated. The experiments were supplemented by tests on a large scale with steel plates immersed in the Monongahela River, the waters of which contain acids from the bordering steel mills and other industrial plants. The tests of steel plates in this river have proved of special interest on account of their bearing on the protection of steel dams constructed in the river by the Army engineers. These tests will be continued during the coming year; they are being conducted under the direction of J. K. Clement, physicist.

MINE-EQUIPMENT INVESTIGATIONS.

The mine-equipment investigations concerned various problems of mine safety under study by the bureau.

An investigation of the production of noxious gases by gasoline mine locomotives was continued. The object of this investigation is

to discover the conditions under which gasoline locomotives may cause pollution of the air in mines, in order that means of avoiding such pollution may be devised.

Progress was made in the development of a simple, cheap, and workable emergency breathing apparatus, capable of supplying a man with good air for 10 or 15 minutes.

A comprehensive study is being made of the failure of hoisting or haulage ropes in mines. Many fatal and other serious accidents have resulted from the breaking of such ropes, and the bureau hopes to be able to make suggestions for lessening such accidents.

O. P. Hood, chief mechanical engineer, has direct charge of these investigations.

ACCIDENTS IN METAL MINES.

The entire appropriation for mine-accidents investigations during the fiscal year 1912 being required for the continuation of certain coal-mine accident investigations that had been for some time under way, no extended inquiries or examinations could be made concerning accidents in metal mines. An effort was made, however, to collect certain statistical data to show the nature and extent of these accidents, with the result that the number of fatal accidents in metal mines, in proportion to the number of men employed, was found to be nearly or quite as large as in the coal mines of the country. During the winter G. S. Rice, chief mining engineer, visited the zinc mine at Franklin, N. J., to observe the mining methods, and also to note the effects of the rock dust produced in drilling on miners, and the effects of the dust in the mill on the mill hands. In this mine the gangue is mainly limestone or calcite, and no serious trouble from this dust was discovered.

The Territorial inspector for Alaska, Sumner S. Smith, reported to the Bureau of Mines a number of fatal accidents in Alaska mines during the past few years. He also investigated the poor ventilation of many metal mines in the Territory, and the occurrence of miners' phthisis, or "miners' consumption," caused by breathing air containing sharp particles of rock dust. It is proposed to follow up this inquiry and ascertain by means of a sampling device the amounts of rock dust that miners are likely to inhale under certain conditions.

H. M. Wolfen, mining engineer, with headquarters at Billings, Mont., whose principal duty is a study of coal-mine accidents and conditions in Montana, Washington, and northern Wyoming, has investigated at a number of copper mines in Montana.

J. C. Roberts, mining engineer, with headquarters at Denver, whose principal duty is a study of coal-mine accidents and condi-

tions in Colorado, Utah, and New Mexico, visited certain gold mines at Cripple Creek, Colo., to investigate the occurrence of certain gases and the need of first-aid work in the mines of that district.

In an examination into the effects of the siliceous dust on the health of miners in mines where drilling operations are extensive, the late Dr. Hotchkiss, of the Public Health Service, cooperating with the Bureau of Mines, found in several western mining districts that deaths from tuberculosis among these miners were largely in excess of the normal. The bureau is now studying preventive measures for use in mines where siliceous dust is produced.

FUEL INVESTIGATIONS.

INSPECTION OF GOVERNMENT FUEL PURCHASES.

The inspection of coal purchased for the Government is conducted from the headquarters of the bureau in Washington, where the engineer in charge of inspection is stationed and the laboratory for analyzing samples of deliveries is situated. The work done includes the collecting, analyzing, and testing of samples representing deliveries of coal purchased under Government contracts providing for purchase on a specification basis, in order to ascertain whether the coal represented by the samples conforms to the stipulations of the contracts. On such contracts the bidders guarantee the quality of the coal they offer, and the quality guaranteed by the successful bidder becomes the standard of his contract. A large part of the coal used by the Government for its power plants, public buildings, and naval stations is purchased under contracts that specify the ash and moisture content, the heating value, the limits of the volatile matter, and the sulphur content. The analyses of samples of deliveries determine whether the quality of the coal is up to the standards guaranteed by the contractor. If it is not, the price to be paid is decreased in proportion to the lower value of the coal. If the coal is of higher quality the price is increased proportionately.

In the collection of samples a definite scheme of procedure is followed. By following the instructions of the Bureau of Mines and by observing every practicable precaution the collection of samples fairly representing the coal delivered is insured. The gross samples taken are reduced by successive crushings, mixings, and partings to samples that weigh about 3 pounds. These are sent by mail to the laboratory in Washington.

The steaming tests that have been conducted and the advice given by the bureau's engineers are resulting in economies to the Government. For instance, by a change in the kind of coal used one Government boiler plant is spending between \$4,000 and \$5,000 a year

less than formerly for fuel; another Government plant reduced its annual expense for fuel about \$15,000. Other striking examples might be mentioned, the Isthmian Canal Commission and the Panama Railway & Steamship Co. having reported still larger savings.

The specification method of purchase protects the Government against the delivery of poorer coal than that guaranteed by the contractor and incites dealers to prepare the coal more carefully. When contractors deliver inferior coal—that is, coal below the contract standard—the loss in value is deducted by the Government in making payment.

In the purchase of coal for use on naval vessels, at the request of the Navy Department the mines from which purchase is proposed are carefully examined by the engineers of the bureau as to their mining and shipping facilities and samples of coal are collected from several parts of each such mine and analyzed at the Pittsburgh laboratory; in this way a standard of high-grade coal, low in ash and volatile matter, is fixed, which must be maintained in subsequent shipments. Occasional samples of coal are collected as the coal is being loaded on ships, and if the results show that the coals as loaded are not up to the standard a contractor is promptly notified that the coal shipped must comply strictly with the contract specifications, and on further failure to do this his contract is annulled.

Coal purchased under specifications of this nature and used on naval vessels amounted in round numbers to 730,000 tons during the fiscal year 1912.

In the fiscal year 1912 the purchases of coal by the Government, under specifications providing for payment according to the quality of the coal delivered, amounted to approximately 1,500,000 tons, costing \$4,750,000. The purchases of 1912 show an increase over those of 1911 of approximately 408,600 tons, costing about \$1,666,000, the increase in tonnage being 37 per cent.

During the fiscal year 1912, 11,300 samples were received. This number is an increase of 3,070, or 37 per cent, over the number received for the fiscal year 1911. The branches or institutions of the Federal service from which the samples were received are given in the table below. The term "local" refers to the samples collected within the District of Columbia; the term "outside" refers to samples from outside of the District of Columbia.

Samples of coal deliveries for the Government received by the fuel-inspection laboratory.

Branch of Federal service from which received.	Number of samples.		
	Local.	Outside.	Total.
Department of Agriculture.....	103	8	111
Department of Commerce and Labor.....	108	628	736
Department of the Interior.....	289	17	306
Department of Justice.....	18		18
Department of the Navy.....	56	701	757
Department of State.....	2		2
Department of the Treasury.....	184	1,047	1,231
Department of War (Ordnance Department and buildings in Washington).....	180	462	642
Department of War (Quartermaster's Department).....	181	4,425	4,606
Department of War (United States Engineer Office).....	10	72	82
Department of War (Office of Public Buildings and Grounds and Washington Monument).....	83		83
Post Office Department (Washington).....	89		89
Smithsonian Institution.....	56		56
Municipal Building.....	31		31
Pan American Building.....	9		9
Government Printing Office.....	96		96
National Botanic Garden.....	13		13
Isthmian Canal Commission.....	8		8
Capitol power plant.....	90		90
State, War, and Navy Building.....	88		88
Panama Railroad Co.....		1,526	1,526
National Home for Disabled Volunteer Soldiers.....		539	539
Soldiers' Home (Washington).....	94		94
Miscellaneous.....	33		33
Total.....	1,821	9,425	11,246

Fifty-four samples of Alaska coals, collected by the director, were also analyzed.

To determine the award of a particular contract, or to advise other bureaus and departments of the Government how a particular coal can be utilized most efficiently, or to ascertain what kind of coal can be burned to best advantage in a particular type of furnace, or what changes in equipment will enable any particular Government building or plant to use efficiently the cheaper local coals available in the local market, the bureau occasionally conducts in its own experimental plant, or cooperates with local engineers in conducting steaming tests of the coals under consideration. These tests are made at the Pittsburgh experiment station, at local power plants of the Government, or on board Government ships. The most important tests in which the bureau participated during the year were made at the Freedmen's Hospital and the Capitol power plant, in the District of Columbia, and on the battleship *Colorado*, off the Pacific coast. The tests on the *Colorado* were made to furnish the Navy Department with information as to the value of western coals as fuel for naval vessels.

It is necessary in some cases for engineers of the bureau to visit the coal mines that are to supply the coal offered by the bidders, to take samples of coal for analysis, and to collect information relating to the capacity of the mines or their ability to deliver to the Government coal shipments in accordance with a particular contract.

On February 15, 1912, representatives of the several branches of the Federal service interested in the purchase of coal attended a conference at the Bureau of Mines for the purpose of discussing the results obtained in the purchase of coal under the specifications and the adoption of a specification of general form and substance for the entire service. Without exception, the representatives approved the specification method of purchase. In accordance with the wishes of the conference, specifications were prepared by committees and were submitted by the bureau to the departments and institutions interested. From the information that has come to the bureau the specifications met with the favor of Government officials as well as of the coal trade, and satisfactory bids were generally received under these specifications for the fiscal year 1913.

The success of the specification method depends largely on the collection of a representative sample sent to the laboratory. The methods of analyzing and testing in the laboratory are well established, but unless the samples represent the coal delivered, the laboratory results, however accurate, are worthless for determining the price to be paid for the coal. Each year local engineers are becoming more experienced and efficient in the collection of representative samples. Recognizing the great importance of correct sampling, the new specifications present in detail the proper method of sampling.

Another important feature of the new specifications is that the heating value of the coal is stated on the "dry-coal" basis and not on the "as-received" basis as heretofore. The reason for the change is the difficulty of keeping the moisture content of a sample unchanged during successive crushings, mixings, and reductions; in consequence of the loss of moisture in preparing the sample, payments based on the British thermal units determined "as-received" basis, are unduly high and favor contractors. To protect the Government against having to pay for free water in coal shipments the new specifications provide for a maximum moisture content, and in awarding a contract, the coal with the lowest moisture content is given the highest rating. If, during the life of a contract, the coal delivered appears to contain more moisture than the bidder's guaranty, the Government collects a special sample, and the price paid for the coal is reduced in proportion to the excess of moisture found in the sample. In this way the price paid for delivered coal is not subject to uncontrollable moisture variations, and it is only in exceptional cases that the contractor obtains the advantage of moisture losses during the collection and preparation of samples.

Under the present organization of the bureau, the fuel-inspection laboratory is in the chemical division and the collection of samples from shipments is in charge of O. P. Hood, chief mechanical engi-

GAS-PRODUCER INVESTIGATIONS.

One of the reasons why the use of the gas producer as a source of power has not increased more rapidly during the last few years is that at many plants operating under commercial conditions high-grade coal has to be used to insure efficiency.

The object of the gas-producer investigations of the bureau is to determine with exactness the conditions within the producer during operation and to apply the results obtained to the development of a producer that will utilize efficiently large quantities of the poorer grades of fuel, culm, and coal-mine refuse now wasted. The study of the possibilities of a producer that melts the ash and permits its removal in a fluid state was regarded as pioneer work in a promising field, and experiments with an experimental producer of this type were made during the year.

In the course of these experiments 32 tests were made at various rates of combustion, with different thicknesses of fuel bed, and with and without steam in the blast. The air blast was preheated in some tests and in some was not. In most of the tests coke was used as fuel. One test was made with Rhode Island graphitic anthracite, one with Pittsburgh slack, one with Texas lignite, and two with Philippine coal. Preheated air in the blast gave a more fluid slag and a richer gas than air at room temperature. The results of using steam were somewhat unsatisfactory, undoubtedly because the steam entered too near the top of the fuel bed. The introduction of a little steam with the air through the air tuyères gave much better reduction of the steam than the introduction of steam through the steam tuyères.

In the tests with coke a fluid slag could be readily made. The Rhode Island anthracite, though it contained 18 per cent ash and burned with difficulty in an ordinary grate, gave excellent results. The slag could be tapped off every hour, and the quality of the gas produced was satisfactory.

In the tests with Texas lignite and Philippine coal the gas was excellent, but the fuel disintegrated rapidly after being charged on the fire, and there seemed to be difficulty in maintaining a combustion zone sufficiently hot to fuse the ash and limestone. In the test with Pittsburgh slack the gas produced was excellent; the indications were that the ash could be slagged readily.

A preliminary report on the above tests was published as Technical Paper 20. A bulletin on the commercial trend of the development of the gas producer in the United States was prepared for publication by Prof. R. H. Fernald, consulting engineer.

BRIQUETTING INVESTIGATIONS.

The briquetting investigations of the bureau have for their object the devising of a method by which low-grade fuels, such as lignites, the poorer subbituminous coals, and mine slack, can be converted into fuel of good quality that will withstand long transportation.

The bureau has at its Pittsburgh station a briquetting plant, which has been described in several publications. As the funds available for fuel-testing investigations were insufficient for making tests on a large scale at this plant, the work of the briquetting section was restricted almost wholly to laboratory demonstrations.

Some experiments with lignite from North Dakota showed the possibility of successfully briquetting these lignites without the use of a binder. The briquetting qualities of Texas and North Dakota lignites with water-gas pitch, flour, and sulphite pitch as binders were tested with a small hydraulic press. Further tests were made to briquet Texas lignite without a binder on the same press, and a sample of California lignite that had been weathered for two and one-half years was successfully briquetted without a binder.

At the national mine-safety demonstration, October 30, 1911, the large English and German presses at the Pittsburgh station were shown in operation.

Two trips to obtain information in regard to the fuel-briquetting industry were made, in the course of which plants in Pennsylvania, New York, Massachusetts, Rhode Island, Indiana, Missouri, Minnesota, Wisconsin, Illinois, and Michigan were visited.

The number of inquiries relating to briquetting was over twice as large as in any previous year, showing the increasing interest in briquetting.

Work on a bulletin reviewing all the briquetting tests made by the Government since the start of the fuel-testing plant at St. Louis in 1904 was continued.

The work of the briquetting section was in charge of C. L. Wright, engineer.

COKING INVESTIGATIONS.

The main object of the coking investigations conducted during the year was the determination of the conditions governing the combustion of coke within a foundry cupola. An exact knowledge of combustion conditions is necessary as a basis for the most efficient utilization of coke in foundry practice. Work was chiefly confined to investigating the gases and temperatures in different parts of the fuel bed of the cupola. Seventeen tests, which entailed the taking of 176 samples and the making of 528 determinations by the chemical laboratories, were made to determine the composition of the gases,

and 60 tests which entailed about 4,000 separate observations were made to determine temperatures.

The results of these tests show conclusively in what section of the fuel bed iron can be melted most efficiently. They also show the conditions of combustion at this section and the method to be followed to produce hot fluid iron free from defects due to oxygen. Incidentally, the physical properties of coke and the means of testing these qualities were studied, in order that practical and equitable specifications for the purchase of coke by the Government can be recommended and a definite plan for determining the relative value of new grades of coke can be devised.

To procure information in regard to the various grades of coke produced in the United States all the coke manufacturers of the country were requested by a circular letter to furnish details. Over 85 per cent of the manufacturers replied. Some 84 samples of coke have been submitted and tested; these samples were accepted only from operators who have no facilities at hand for making tests. The results of the tests made by the bureau and the data submitted by operators who make their own tests are to be used in preparing specifications for the purchase of coke.

Various by-product coke plants in Illinois, Indiana, Wisconsin, and Alabama were visited in June.

A report embodying the results of the tests with the experimental cupola was prepared for publication as a bulletin entitled "Foundry Cupola Gases and Temperatures."

The coking investigations were in charge of A. W. Belden, engineer.

LIGNITE AND PEAT INVESTIGATIONS.

As part of the work relating to the study of the composition, heating, and utility of the fuel supplies in the public lands the bureau is investigating the origin and utilization of peat. These investigations, though of general interest, are of particular importance to the inhabitants of States remote from the great coal-producing centers or in regions where firewood is becoming increasingly difficult to procure. Thus during the winter of 1911-12 good domestic fuel was scarce and high-priced at many points in Michigan, Minnesota, New York, and the New England States, although in all of the States mentioned there are peat beds of good area and depth lying entirely undeveloped which might afford for local needs a fuel suited for domestic uses or for power production.

The results of the bureau's investigations show that peat, if properly prepared and well dried, has a greater heating value than wood, and that if its freedom from ash, clinkers, and sulphur are considered, as well as its giving off little smoke and burning up com-

pletely, it compares favorably with anthracite. In addition, it should be possible in many places to put peat on the market near the point of preparation at less than half the present prices of the better-known fuels.

However, many attempts at peat utilization in this country during the past decade have proved impracticable and the capital invested, amounting to hundreds of thousands of dollars, has been completely lost. Hence the Bureau of Mines is giving especial attention to the study of those methods of utilization that have proved successful in other countries and that may be adapted to the types of peat found in this country and to the conditions under which the peat is to be prepared and marketed.

The work carried on during the fiscal year included field studies of the nature and origin of peat and the methods by which the peat beds examined might be most efficiently utilized.

By means of heating-value tests and chemical analyses of samples the value of different peats as fuel was studied in comparison with other fuels better known in the regions from which the samples were taken. Through physical and microscopic analyses the origin of the principal types of peat and the structure and condition of the material of which they are composed were carefully studied, since these have an important bearing on the methods of preparing the raw material for use. In addition, studies were undertaken to learn the relation of peats to older types of fuel.

Several factories that now produce peat were examined in order to follow the advances in peat utilization in the United States. Through correspondence with English, Canadian, German, and Swedish authorities, the progress made in Europe in utilizing peat fuel for power and other purposes was closely noted.

Cooperative work on peat was undertaken with another bureau of the Government and with the Ohio State Geological Survey.

Bulletin 16 was published during the year. Six papers dealing at some length with scientific and technical phases of the origin and use of peat were prepared, and a bibliography was compiled of the matter published in American and foreign publications during the year on peat and its uses.

The investigations of peat were in charge of C. A. Davis, fuel technologist.

CHEMICAL INVESTIGATIONS OF THE CONSTITUTION OF COAL.

The chemical methods used by the bureau in its endeavor to ascertain the constitution of coal and the relation of differences in constitution to the uses of coal include the extraction of soluble constituents with organic solvents and the examination of the fractions separated. Preliminary studies have shown that such methods can be used suc-

cessfully in isolating and identifying constituents. These chemical examinations are being supplemented by microscopic and other physical examinations of similar coals, by field studies as to the origin and history of the coals, and by other chemical researches, such as destructive distillation, in the endeavor to aid in solving some of the problems concerning the constitution of coals and how different coals can be used more intelligently.

Coal from the Pittsburgh bed yielded 17 per cent of material soluble in pyridin. This pyridin-soluble material was extracted with ethyl ether, petroleum ether, and methyl alcohol, successively, and the substances separated by such treatment were examined. These substances are to be separated into fractions by treatment with other solvents or, where practicable, by means of vacuum distillation, and the identity of the several fractions is to be investigated. When the study of one coal has been completed, other coals will be investigated by the same or a similar method.

The investigation concerning the constitution of coal by the method of extraction is now in charge of E. J. Hoffman, assistant chemist.

MICROSCOPIC INVESTIGATIONS OF THE CONSTITUTION OF COAL.

The microscopic investigations of coal have for their object the determination of the organic remains entering into the composition of coal, and the effect of these remains and of their present condition in the coal upon the properties of coal and its various uses as fuel.

During the year work on the problem of why certain coals coke and others do not was begun, and some valuable data were obtained.

The following problems have been studied incidentally:

Cellulose in coal.—Microchemical tests have shown that no cellulose is present in any of the coals examined, including lignites and subbituminous coals. The tissues that were originally composed of cellulose are now some derivative or derivatives of cellulose, the nature of which is unknown. It seems possible that this compound or compounds may be separated and definitely determined.

Colloidal chemistry of coals.—It has been demonstrated that coals and peats contain typical colloids which may be brought into colloidal solution, and the investigations of the year throw light on the nature of these colloids and their influence in the utilization of coal.

The effect of the state of maceration of the original material forming coal on the constitution of the coal.—The problem of the effect of the condition of the original coal-forming material had been studied in connection with previous work on the genesis of coal. The results obtained are expected to explain some of the differences in coals and their varying suitability for particular uses.

A bulletin on the constitution and genesis of coal was revised and is now in course of publication.

Microscopic measurements of electric-light filaments and microscopic examination of insulating tapes and electric wire were made in connection with other work at the Pittsburgh station.

The microscopic investigations of coal were in charge of Reinhardt Thiessen, assistant chemist.

DETERIORATION AND SPONTANEOUS HEATING OF COAL IN STORAGE.

Several departments and establishments of the Government store large quantities of coal. The Bureau of Mines has continued its investigation of the actual loss of heating value in stored coal and the factors that cause spontaneous heating during storage. This work was done in cooperation with the Navy Department and the Panama Railroad Co. Data obtained by the examination of coal stored for two years have been compiled and will be presented in a bulletin now in course of preparation. In connection with this investigation 174 samples of coal were analyzed during the year and 489 determinations were made.

The investigation of spontaneous combustion of coal included both the fundamental chemical reactions involved and the influence on these reactions of the conditions, such as temperature, moisture, and ventilation, that exist during commercial storage. The rate of oxidation of coal at temperatures below the burning point was studied in the laboratory with reference not only to the effect of temperature, but the fineness of division of the coal and the percentage of oxygen (or CO_2) in the air upon the rate of the reaction. An endeavor was made to show that spontaneous combustion is largely dependent upon physical factors established by the methods of handling and storing the coal. The rate of oxidation of the sulphur compounds in coal was studied in order to determine its importance as a factor in spontaneous combustion. Several coals were tested for their friability or tendency to produce fine coal and dust on handling.

Visits were made to a number of places where cases of spontaneous combustion were to be observed.

The laboratory investigations pertaining to spontaneous combustion involved 227 experiments, with 956 determinations.

Coking and by-product tests of three samples of coal from Alaska were made.

An investigation of the effect of weathering on the composition and character of the coal in the Pittsburgh bed at the experimental mine near Bruceton, Pa., was undertaken. Samples taken at the outcrop and in the entries at increasing distances from the outcrop were examined to determine their chemical composition and the rate at which they absorbed oxygen and liberated occluded gas.

The tests and determinations made in analytical work connected with the investigations were as follows:

Tests and determinations made in investigations of deterioration and spontaneous heating of coal in storage.

Nature of investigation.	Number of samples or tests.	Number of determinations.
Storage tests of coal.....	174	489
Rate of oxidation of coal.....	157	734
Oxidation of sulphur in coal.....	21	80
Specific heat of coal.....	27	27
Breakage, or friability, tests of coal.....	16	103
Analysis of air from coal piles.....	6	12
Coking and by-product tests of Alaskan coals.....	6	108
Weathering of coal in the bed.....	92	280
Total.....	499	1,783

Technical Paper 16 was published during the year and Bulletin 1 was revised for reprint.

The investigations described above were in charge of H. C. Porter, chemist, and F. K. Ovitz, assistant chemist.

PETROLEUM TECHNOLOGY.

The petroleum investigations conducted by the bureau comprised a study of the methods of boring for oil, with especial reference to methods of preventing the waste of oil and gas at wells on or adjacent to public lands; the study of the proper storage and transportation of oil and gas; the study of refining methods in order to ascertain the best processes for refining oil and improving the quality and increasing the yield of commercial products; and the study of fuel oils belonging to or intended for the Government, with especial reference to increasing efficiency and economy in their utilization.

FIELD INVESTIGATIONS.

Investigations of the methods of boring wells, including the various types of derricks and tools, and of the most efficient methods used, were made in California, Oklahoma, Louisiana, Colorado, and other oil fields. The cementation process used in the California fields for excluding water from oil wells was given particular attention. A study of the relative efficiency and cost of earthen, concrete, and steel reservoirs for the storage of large quantities of oil is being made.

Through field studies a large mass of information relating to the influence of depth below surface and other geologic relations upon the quality of petroleum in certain California fields has been accumulated and is being prepared for publication.

The investigations relating to the mining of oil were conducted by I. C. Allen, chemist, and Ralph Arnold and F. G. Clapp, petroleum engineers.

LABORATORY INVESTIGATIONS.

The work done by the petroleum laboratories of the bureau involves analyses and tests and special studies relating to the utilization of petroleum and its products for fuel and other purposes.

One of the most important tasks carried on during the year was the preparation of specifications for the purchase of various petroleum products by the Government with the purpose of describing the properties desirable in these products and of showing methods of testing these products to insure efficient utilization for fuel or other purposes. This work and a study of more accurate methods of analyzing petroleum products are being carried on in collaboration with testing committees of the International Petroleum Commission, the American Society for Testing Materials, the American Chemical Society, the National Petroleum Association, the National Fire Protection Association, and professors of chemistry and engineering in several universities in the United States. Some results of the analytical work have been submitted for publication as Technical Paper 25, "Methods for the Determination of Water in Petroleum and its Products," by I. C. Allen and W. A. Jacobs, and Technical Paper 26, "Methods of Determining the Sulphur Content of Fuels, Especially Petroleum Products," by I. C. Allen and I. W. Robertson.

Photometric tests of oils for miners' safety lamps and smoke tests of open lamps were begun in an endeavor to show how the oils can be burned more efficiently and with greater safety to the miner than in ordinary practice and how the oils can be improved. The utilization of heavy oils and so-called waste residues for fuel is under study. Several machine shops in Europe, at which internal-combustion engines burning heavy oils are constructed, were inspected in order to gather data to show how the heavy oils of the Pacific and Gulf coasts and the residues therefrom can be used in internal-combustion engines far more efficiently than by present methods of burning under steam boilers. A report on this work is being prepared for publication.

A petroleum laboratory has been installed in San Francisco, where the fuel oils of the Pacific coast are being examined, and preparations for stationary, locomotive, and marine steaming tests of fuel oil are being made, as are also preparations for tests of these fuel oils by burning in internal-combustion engines, particularly for marine propulsion. Many samples of petroleum and petroleum products were analyzed for the War Department, the Navy Department, the Post Office Department, and the Supervising Architect's Office. In these analyses 2,335 individual tests were made at the petroleum laboratories.

A large number of samples of crude oil were collected directly from the wells in certain fields by a representative of the bureau in order to insure a reliable history of each sample. These samples

were analyzed by the bureau's chemists in order to ascertain the quality and quantity of the commercial products that can be profitably obtained from the oils they represent. This work is to be continued.

In collaboration with the gas-investigation laboratory of the bureau the natural gas of the oil fields was studied, and the possibility of recovering gasoline on a commercial scale from natural gas now wasted or inefficiently used was given especial attention.

A matter to be investigated in collaboration with the National Fire Protection Association is the efficient transportation and storage of oil with reference to freight shipment and the safety of the public. Another matter that should be studied is the manufacture of producer and illuminating gas from oil wastes.

The petroleum laboratories at Pittsburgh were in charge of I. C. Allen, chemist, who had supervision of the laboratory investigation of petroleum. He was assisted in Pittsburgh by W. A. Jacobs, A. S. Crossfield, and I. W. Robertson, junior chemists, and in San Francisco by R. R. Mathews, junior chemist.

FUEL-GAS LABORATORY.

The fuel-gas laboratory at the Pittsburgh station analyzes samples of flue, furnace, and other gases collected in the course of fuel-efficiency, producer-gas, or metallurgical investigations.

The analyses made were as follows:

Analyses made in the fuel-gas laboratory.

Source of gas.	Number of samples analyzed.
Long combustion chamber.....	1,582
Gas producer.....	174
Cupola.....	151
Total.....	1,907

The laboratory was in charge of A. E. Hall, assistant chemist, assisted by L. L. Satler, junior chemist, until May 1, 1912. After May 1 the laboratory was in charge of F. K. Ovitz, assistant chemist.

FUELS CHEMICAL LABORATORY.

The fuels chemical laboratory is at the Pittsburgh experiment station. It is engaged in analyzing samples representing fuels belonging to or for the use of the Government and samples received from other sections of the bureau. The samples include:

(1) Mine samples or samples representing fuel for the use of the Government.

(2) Mine and field samples of coal and lignite collected by the United States Geological Survey and some State geological surveys

in connection with coal-land classification and geologic investigations.

(3) Samples taken in connection with peat investigations.

(4) Samples of coal dust, road dust, and coked dust taken during investigation of mine accidents and tests of the inflammability of coal.

(5) Samples of coal, coke, lignite, peat, ash, clinker, etc., taken in the course of steaming, gas-producer, combustion, and briquetting investigations at the Pittsburgh station.

(6) Samples of miscellaneous materials, such as clinkers, slags, mine waters, metals, and ores, not included in the work of other laboratories at the Pittsburgh station.

The samples received for analysis during the fiscal year may be briefly classified in the following manner:

Samples tested in the fuels chemical laboratory of the Bureau of Mines at Pittsburgh.

Standard mine samples of coal:

Collected by—

Bureau of Mines.....	233
Forest Service.....	25
General Land Office.....	4
Illinois Geological Survey.....	76
United States Geological Survey.....	137
	475

Samples from mine-accidents division:

Road dusts from coal mines.....	53
Coal dusts from coal mines.....	17
Coal dusts partly coked by explosions and mine fires.....	23
Coal dusts for inflammability tests.....	30
Sugar for inflammability tests.....	1
Lycopodium for inflammability tests.....	1
Gluten for inflammability tests.....	1
Shale dust for inflammability tests.....	1
Shale and limestone.....	1
Underclay.....	1
Clay partings.....	1
"Draw slate".....	1
Residue at stopping.....	1
White substance.....	2
Yellow deposit.....	2
Water and culm.....	3
Crystalline material.....	1
Copper wire.....	1
Calcium chloride and salt.....	3
Slag.....	1
Mine water.....	23
	168

Samples from fuel-testing division :

Coal, coke, ash, residual fuel, clinkers, etc., from tests.....	708
Peat	24
Petroleums	19
Inspection of coal and coke purchased for the use of the Government.....	272
Coal and coke samples from other Government bureaus.....	43
Ferroflux.....	1
Dolomite.....	1
Limestone.....	1
Slag.....	19
Dust and deposits from gas producer.....	2
Tar.....	10
	1, 088

Miscellaneous samples :

Alloys.....	7
Titaniferous magnetites.....	37
Iron ore.....	1
Mill dust.....	1
	46

The origin of the above samples is given in detail below :

Samples of coal, lignite, peat, and petroleum received at fuels chemical laboratory.

Alabama Geological Survey.....	17
Briquet tests	4
Bureau of Standards.....	14
Coke and cupola investigations.....	76
Committee on Indian Affairs.....	1
Experimental investigations	73
Explosives.....	2
Gas-producer tests	6
General fuel testing—car samples, etc.....	66
Illuminating-gas investigations	2
Inflammability investigations	23
Inspection of coal for Government use.....	225
Isthmian Canal Commission, inspection of coal and coke.....	47
Locomotive-boiler tests.....	107
Long combustion chamber investigations.....	61
Mine-accidents investigations—road dusts, coked dusts, etc.....	93
Mine samples, mine-accidents investigations.....	130
Mine samples, coal purchases for the Navy Department.....	14
Mine samples, coal purchases for the Panama Railroad.....	7
Mine samples, coal purchases for the Government and coal deposits be- longing to the Government.....	82
Mine samples collected by the Illinois Geological Survey.....	70
Mine and field samples collected by Forest Service.....	25
Mine and field samples collected by General Land Office.....	4
Mine and field samples collected by the United States Geological Survey.....	137
Peat investigations.....	24
Petroleums	19
State Department.....	4
Steaming tests.....	205

Reclamation Service	7
War Department, fuel-equivalent tests	17
Weathering and storage tests for Navy Department and Isthmian Canal Commission	87

 1, 660

Miscellaneous samples were received and analyzed at the Pittsburgh laboratory from other sections of the station's work as follows:

Miscellaneous samples received at fuels-chemical laboratory.

Electrical section:	
Mine waters	23
Explosives section:	
Slag	1
General fuel-testing division:	
Ferroflux	1
Inflammability investigations:	
Lycopodium	1
Sugar	1
Gas-producer section:	
Coke	1
Dolomite	1
Dust from scrubber	1
Graphite	1
Limestone	1
Slags	19
White powder from producer	1
Interior Department:	
Alloys	7
Iron-ore investigations:	
Titaniferous magnetite	37
Long combustion chamber investigations:	
Tar	10
Mine-accidents division:	
Clay parting	1
Copper wire	1
Crystalline material	1
"Draw slate"	1
Gluten	1
Waxy residue at stopping	1
Calcium chloride and salt	3
Shale dust	1
Shale and limestone	1
Underclay	1
Water and culm	3
White deposit	2
Yellow deposit	2
State Department:	
Iron ore	1
Treasury Department:	
Mill dust	1

 127

Total samples received

 1, 787

In analyzing the 1,660 coal, lignite, peat, and petroleum samples enumerated above for the Bureau of Mines and other branches of the Government service, there were 19,139 chemical determinations made in this laboratory, distributed as follows: Moisture, 3,447; ash, 3,507; volatile matter, 3,185; fixed carbon, 1,345; sulphur, 2,419; hydrogen, 1,014; carbon, 1,014; nitrogen, 1,136; oxygen, 354; heating value, 1,688.

Considerable time was devoted to checking the galley proofs of a large bulletin on Analyses of Coals of the United States, July 1, 1904, to June 30, 1910, and the manuscript of another bulletin giving the analyses of mine samples of coal received during the fiscal year 1910-11, which was about completed at the end of the year.

An investigation of the effect of temperature on the yield of volatile matter in the analysis of coal and coke is in progress. The results will be published in a technical paper.

Other investigations for the improvement of the methods of coal analysis are being pursued.

The personnel during the year included A. C. Fieldner, assistant chemist, in charge of laboratory; D. I. Brown, A. M. Wedd, G. E. Webster, from July 1, 1911, to March 1, 1912; H. G. Woodward, from February 29, 1912; Max Hecht, July 1, 1911, to September 15, 1911; W. A. Selvig, from September 18, 1911; F. D. Osgood, from October 4, 1911; and A. E. Hall, from May 1, 1912, junior chemists.

MISCELLANEOUS TECHNOLOGIC INVESTIGATIONS.

SMELTER-FURNACE PROBLEMS.

Shortly before the close of the fiscal year 1912 the bureau established an office in the customs building, San Francisco, Cal., and a small laboratory in the old appraisers' building adjacent thereto. Two rooms have been equipped for a chemical laboratory and one for a machine shop; another is to be equipped with both electric and gas-fired furnaces for experimental work.

The chief problem investigated was that of damage to Government property by smoke and fumes from smelters, and the means used or proposed for preventing such damage and for recovering and utilizing commercially valuable substances in the fumes. The abstracting and indexing of the more important literature bearing on smelter fumes is under way.

Various smelters and refining plants, 22 in all, in different parts of the country have been visited for the purpose of making a comparative study of methods and conditions and for ascertaining the most urgent needs of the smelter industry and the most promising ways of attacking the problems under study. These field investigations of existing plants are necessary because many of the problems at issue

are so interwoven with the conditions of continuous large-scale operation that it is impossible to reduce them to a laboratory scale. The possibility of increasing the demand for substances now going to waste in smelter gases is also being studied. The extension of the present uses of sulphur and arsenic, as in the sulphuric-acid industry (including the manufacture of superphosphate fertilizer), and the discovery or elaboration of new uses for these substances are part of this problem. This line of research is of especial importance because it would be entirely practicable to collect many times the amount of sulphuric acid and arsenic now recovered from smelter gases in the country, if a sufficient and stable market could be found for them at present prices or even, in many cases, at much lower prices.

The laboratory work done has related chiefly to the testing of methods for determining the amounts of arsenic, sulphur dioxide, and sulphuric acid in air and in flue gases, as there has been much divergence of opinion and uncertainty among chemists as to the most accurate and reliable methods. The results of this work are to be embodied in a preliminary report.

Another line of work on which a beginning has been made is an investigation of certain physical and chemical properties of the more important substances entering into metallurgical operations. For instance, knowledge of the vapor pressure of compounds of arsenic, mercury, zinc, and lead, of the heat of formation of different types of slags, and of the equilibrium relations between sulphur, iron, oxygen, and silica in the copper converter is needed for the intelligent solution of problems relating to greater efficiency in metallurgical operations.

The investigations described above were in charge of F. G. Cottrell, chief physical chemist, who was aided by two assistant physical chemists, W. Eaton (from Aug. 15, 1911) and H. V. Welch (from Dec. 27, 1911).

REDUCTION OF IRON ORES WITH CRUDE OIL AND OTHER FURNACE PROBLEMS.

The bureau has undertaken an investigation of the possibility of the reduction of iron ores by means of crude oil. The benefits to be derived from a practicable solution of this problem are twofold, namely: (1) Making possible the treatment of the iron-ore deposits of California, which at the present time can not be smelted profitably because of the high cost of coke and charcoal on the Pacific coast, and (2) the utilization of residual petroleums which at the present time are used mainly for surfacing roads.

The work was conducted at the Harvard metallurgical laboratories, Cambridge, Mass., until June 1, 1912, when it was transferred to the experiment station at Pittsburgh. Satisfactory results had been ob-

tained in experiments made before the transfer of the work to Pittsburgh, and much information for a report on the investigation had been accumulated by the end of the fiscal year.

This special investigation is being carried on by D. A. Lyon, metallurgist, who is also preparing a report on the use of electric furnaces in metallurgical operations.

INVESTIGATION OF METALLURGICAL FURNACES.

Plans have been formulated for the collection of information and the starting of investigations concerning the different types of metallurgical furnaces and the chemical changes taking place within these furnaces during the treatment of ores and other mineral substances. Arrangements have been made for supplementing the laboratory experiments by observations of the working furnaces found in various metallurgical plants.

This investigation of furnaces is made with special reference to important problems in the less wasteful treatment of ores and other mineral substances, such, for example, as the following:

The reduction of iron ores by means of crude petroleum and the electric furnace, as mentioned above.

The treatment of complex sulphide ores.

The extraction of those rare metals that are used in making special steels, etc.

The work outlined above is in immediate charge of D. A. Lyon, metallurgist, who has the assistance of J. F. Cullen. The general investigation of different furnaces with reference to the more efficient treatment of ores and other mineral substances is under F. G. Cottrell, G. A. Hulett, and C. L. Parsons.

LOSSES IN THE LEAD AND ZINC INDUSTRY.

An investigation of the efficiency of the present methods of mining and concentrating lead and zinc ores was planned under the technologic branch of the Geological Survey. It has been continued during the fiscal year 1912 on a small scale, as circumstances permitted, in connection with an inquiry into the safety conditions in lead and zinc mining. Most of the work has been done in the Joplin district, Missouri, where a study was made of the safety conditions and the mining and milling methods at 58 of the principal mines. Representative samples of the mill wastes were taken in order to determine what part of the mill treatment showed the greatest metal losses and to ascertain the causes of such losses.

The investigation has shown that at many mines and mills improvements can be made that will result in greater efficiency or a higher recovery of metal, and that the owners of such plants can,

with no great difficulty, ascertain where the losses are greatest by making necessary tests. The examinations under way also indicate the way to improvements at a number of these plants as to mine timbering, the use of explosives, fire protection, and safety appliances.

Most of these problems pertaining to the mining and milling of the ores in the Joplin district have been presented in a preliminary report soon to be published by the bureau. Another report covering a larger area and giving more detail as to the conditions and possible improvements at lead and zinc plants is to be prepared for publication at an early date.

The work done has emphasized the need of further studies in the Joplin district and the extension of the investigation to other mining districts in Missouri, Arkansas, Oklahoma, and Wisconsin.

This investigation is being conducted by C. A. Wright, assistant metallurgical engineer.

UTILIZATION OF TITANIFEROUS IRON ORES.

Many deposits of titaniferous iron ore, some of them very large, have attracted considerable attention as possible sources of iron. With present furnace practice, however, reduction of ores having more than a small percentage of titanium is difficult and expensive, and consequently such ores are refused by the furnaces.

In its endeavor to bring about the utilization of undeveloped mineral resources in the United States the Bureau of Mines is continuing on a small scale an investigation in relation to the treatment of titaniferous iron ores. This investigation was begun prior to the organization of the bureau and seemed to merit completion.

An examination was made in the summer of 1911 of a number of the more promising titaniferous iron-ore deposits in the United States with a view to determining the distribution of the titanium in such ores.

At least two of the examined deposits, Sanford Hill, in the Adirondack Mountains, N. Y., and Iron Mountain, Wyo., are very large, and only their titanium content has prevented their utilization. To determine the possibility of separating the magnetite from the ilmenite in this class of ores by magnetic concentration the composition of the grains of ore was studied by the microscopic methods used in studying metals and their alloys.

The results of this study, which are to be presented in a bulletin, show that part of the titanium can be separated by magnetic concentration, but that so much of the titanium-bearing mineral, ilmenite, occurs within grains of magnetite that the obtaining by magnetic concentration of concentrates carrying less than about 6 per cent of titanium will be difficult if not impossible.

Hence magnetic concentration of titaniferous iron ores is not feasible unless furnace practice is so modified as to make practicable the smelting of concentrates carrying 6 to 7 per cent titanium, or unless furnaces mix such concentrates with three or four parts of nontitaniferous ores. Because of the low phosphorus and sulphur content of the concentrates the latter alternative is already practicable.

This investigation is being conducted by J. T. Singewald, jr.

* TUNNEL METHODS.

An examination of the safety conditions and of the methods and equipment employed in the construction of mine tunnels was made in connection with the investigation of means for preventing accidents in mining operations. The inquiry, which is almost completed, was conducted under the general supervision of D. W. Brunton, consulting engineer, and J. A. Davis, assistant engineer. The purpose of the inquiry is to obtain for the information of the public such data concerning methods and equipment that are proving safe, efficient, and economical at the places where they are in use and to offer such suggestions as, it is hoped, will result in a saving of life, energy, or money that might be expended for inefficient or unnecessary work. To this end Mr. Davis made detailed observations concerning different phases of the work of tunnel driving, such as equipment, rock-breaking methods, and provisions for the safety of the employees, at over 50 tunnels and examined the recent literature concerning both American and foreign practice in driving tunnels.

A report covering the results of these examinations and inquiries is now in preparation.

MINERAL TECHNOLOGY.

Having in view the lessening of mineral wastes and the increasing of health and safety among persons engaged in various mineral industries, the bureau is conducting a series of investigations covering the field of miscellaneous mineral technology. These investigations are in charge of C. L. Parsons, chief of the division of miscellaneous mineral industries, with headquarters in Washington.

The work of the year was chiefly preliminary and consisted in large part of visits to manufacturing plants, mines and quarries, universities and technical schools, and gatherings of scientific men in order to gain information regarding the more important problems to be investigated.

A number of inquiries relating to safety and efficiency in various branches of the mineral industry were started. Bauxite quarries in Georgia and Arkansas and the fuller's earth deposits in Georgia, Florida, and Arkansas were investigated with regard to possible improvement in present methods of mining and washing.

UTILIZATION OF FULLER'S EARTH.

Mr. Parsons undertook an investigation in person in order to determine why fuller's earth is being shipped into this country when extensive resources of the material are lying undeveloped in several States. Nearly all of the mines and quarries of fuller's earth in Georgia, Florida, and Arkansas, with the exception of those owned by one firm, were visited, and the methods of mining and preparing the raw material were carefully studied. This study was supplemented by work in the laboratory. The results of the investigation, which indicate the possibility of greatly widening the market for domestic fuller's earth, are being prepared for publication as a bulletin.

OCCUPATIONAL DISEASES.

Mr. Parsons is making a study of the literature bearing on the question of ill health or disease directly attributable to the occupation of the person affected, and is conducting examinations into technologic processes with a view to the possible introduction of improvements that would eliminate the poisonous or otherwise deleterious products, and also the improvement of the general health conditions about plants for treating ores and minerals. In this work the Bureau of Mines is supplementing but not duplicating the excellent work concerning the nature and extent of occupational diseases that has been done by the Bureau of Labor.

UTILIZATION OF MICA AND FELDSPAR.

Investigations carried on by A. S. Watts, quarry technologist, in the kaolin, feldspar, and quartz quarries of the Southern Appalachian fields in Virginia, North and South Carolina, and Georgia, have shown that the methods of production and the quality of the product may be improved to the great advantage of the silicate industries; that it is highly probable that semikaolinized feldspar, many thousands of tons of which have been discarded as worthless, may be rendered available to the pottery industry; and that excellent ochre and mica, heretofore wasted in large quantities in washing kaolin, may be saved at a profit. The results of these investigations will be published in a bulletin that is now being prepared.

TREATMENT OF MINERAL SLIMES.

One of the investigations started is a study of the clay colloids and the effects produced by treating them with electrolytes. The purpose of this investigation is to gain some knowledge that may be applied to preventing the loss of substances of economic value in the slimes from plants for washing minerals or ores and to devising

methods of increasing the plasticity of clays for use in engineering construction.

Three methods of attacking the problem are being followed, as follows:

(1) Observing the effect produced by varying content of water and by varying the concentration of the electrolyte upon the volume shrinkage of clay briquets; (2) the effect of some electrolytes in increasing or decreasing flocculation in clay solutions; (3) the influence of some electrolytes upon the viscosity of clay solutions.

This investigation is being carried on by Robert Back, junior chemist, under the direction of the chief of the division.

INVESTIGATION OF RARE MINERALS, WITH ESPECIAL REFERENCE TO NEW SOURCES AND PREPARATION OF RADIUM.

Another series of investigations which have been arranged for and are to be undertaken under the direction of the chief mineral chemist relate to the mining of certain rare minerals, the extraction of the rare metals they contain, and the examination of possible sources of radium.

The work already outlined includes an investigation of the production of carnotite and pitchblende in the United States, the present status of the mining and treatment of these ores, and a study of the best methods of handling and treating them, especially those of low grade. It also includes an examination into the possibility of finding ores containing these rare earths about the waste piles of a number of mines.

Other proposed investigations relating to radium comprise methods of separation and fractionation of radium salts, methods of estimating radium in rocks and minerals, the radium content of native carnotite, and a possibility of making meso-thorium a substitute for radium, and an investigation of native carnotites for their helium content.

The production and treatment of vanadium, tungsten, and other rare metals are to be studied.

The investigations outlined above are to be conducted by R. B. Moore, physical chemist, and associates, who will have a laboratory in Denver, Colo.

OTHER INVESTIGATIONS.

Other investigations under the direction of the chief mineral chemist include:

An examination of the placer washings and tailings from operating mines, to be made in the hope of developing means of conserving the platinum, gold, silver, and other material of possible value; an

investigation of brass and other nonferrous alloys, including the examination of different types of furnaces under comparable conditions, with a view to increasing efficiency and preventing waste; also the modification of existing electric furnaces or the development of a new electric furnace in the hope of preventing the immense losses of zinc that now occur in making brass and other zinc alloys.

SPECIAL MINING INDUSTRY REPORTS.

In addition to the inquiries and investigations now in progress and described above, the bureau is arranging with mining and metallurgical engineers of large experience to prepare for publication reports setting forth the progress and present condition of the more important branches of the mining industry, the part these have played in the industrial development of the country, and the progress being made in each of these branches of industry toward safeguarding the lives of employees and lessening the waste of important resources. These reports are not intended for use as textbooks for schools. Their purpose is rather to let the intelligent citizens of the country understand how their mineral resources are being used and what good results are being accomplished through their use toward the permanent upbuilding of the Nation. They are the natural outgrowth of a careful study of the different branches of the mining industry. The reports now well under way are the following:

(1) Iron Mining in the United States, by Dwight E. Woodbridge. This report will describe the methods of exploring for iron and measuring ore in the ground; mining methods and costs, the concentration and beneficiation of iron ores for the blast furnace and costs of such treatment, methods of increasing safety above and under ground and systems for caring for mine employees' towns; methods of iron-ore transportation by land and water and their costs; scientific management at mines and efficiency engineering; mine taxation; and such other questions as properly come within the scope of the work in describing the various operations from the opening of the iron-ore fields to the dumping of the ore in the stockyard at the furnace.

(2) The Iron and Steel Industry in the United States, by John Birkinbine. This report will describe the more important operations of the industry; the preparing and assembling of the ores, the limestone, and the coke; the operations and products of the blast furnace and the utilization of these products (pig iron, furnace gases, and furnace slag); the operations and the products of the steel mills; the development and distribution of the iron and steel plants in the United States; the part played by the industry in national development; and safety and sanitation problems.

(3) **The Smelter Industry in the United States**, by C. H. Fulton. This report will describe the nature, extent, distribution, and operations of the smelting plants in the United States, their development, their products, the part they have played in the development of the mining industry and of the country, and safety and sanitary conditions at smelting plants.

(4) **The Sampling, Testing, and Assaying of Ores and Metallurgical Products**, by W. J. Sharwood, T. R. Woodbridge, and Edward Keller.

(5) **Safety and Efficiency in American Tunneling**, by D. W. Brunton and J. A. Davis.

Data are now being brought together for similar reports on the quarry industry, the lead and zinc industry, the copper industry, the precious-metal industry, the coal industry, the petroleum industry, and miscellaneous mineral industries.

EXAMINATION OF MINING LAWS AND REGULATIONS.

Soon after the bureau was established the need arose of studying the laws and regulations of the several States of the United States and of foreign countries in order to ascertain the measures taken to guard the safety of miners and to determine what laws and regulations seemed best adapted to prevent accidents and loss of life in the mining, quarrying, metallurgical, and miscellaneous mineral industries of this country. This study involves, in the case of State and Federal laws, an investigation of the decisions of the courts construing such laws in order that the limitations and application of each law may be authoritatively determined. Good progress was made on this work during the year.

It is proposed to annotate, so far as possible, the mining statutes examined; that is, to group under each statute every court decision construing it, so that its exact meaning may be known. In addition, a digest is being prepared that will contain court decisions relating to mining matters and the legal propositions laid down by the courts. The compilation of a glossary of mining words and phrases giving the judicial definition of such words and phrases is contemplated.

It is the hope of the bureau that through the examination of mining statutes and regulations and the publication of digests it may be able to aid State legislatures in framing laws that will help to lessen mining fatalities and increase the health, safety, and comfort of the miner and will assist in bringing about more efficient utilization of the Nation's mineral resources.

During the past year the 222 volumes of the United States Supreme Court Reports, the 190 volumes of the Federal Reporter, and 15 volumes of the Decisions of the General Land Office have been examined. The decisions relating to the United States mining and

mineral-land statutes have been collected and abstracted, and also those relating to the duty and the negligence of mine owners and operators in the employment and treatment of miners, the use of electricity, explosives, and mining and metallurgical machinery, and the risks assumed by miners and other persons employed in the mineral industries and their right to recover damages for injuries.

The coal-leasing laws of foreign countries and of all States having such laws were collected and abstracted.

The examination of mine laws and regulations is in charge of J. W. Thompson, law examiner, assisted by C. B. Dutton, law clerk.

MINE-ACCIDENT STATISTICS.

Although accurate statistics concerning mine accidents in the United States as a whole are essential to the development of intelligent plans to bring about greater safety in mining, and are the important means by which progress toward this end may be determined, such statistics are lacking in regard to quarrying, metallurgical and other mineral-industry plants, and metal mining in many of the States. They are deficient or incomplete in a number of States, and even in the statistics of coal-mine accidents, which in some of the States are well cared for, there is a lack of uniformity in both plans and records.

The Bureau of Mines has no place or desire to duplicate or displace the good work that is being done in a number of States. It desires to cooperate with the inspectors in these and other States in the collection and coordination of the statistics of accidents in the mining and mineral industries. The purpose is to assemble and publish such statistics for the United States, so as to make them comparable in scope and character with the statistics now being published by and for other of the large mining countries.

With the inadequate funds and clerical force at its disposal the bureau has been able to do little more than compare the existing records of this and other countries, and to collect supplemental data concerning accidents in the United States sufficient to determine the deficiencies of the present system and the difficulties in the way of bringing the system over the whole country up to a standard creditable to the Nation.

A cooperative agreement has been entered into with the various State coal-mine inspectors by which the inspectors are to furnish monthly reports of fatalities in the coal mines of their respective States, the bureau compiling the totals for the country and publishing these, with the accidents classified according to cause. The first publication (13 pages) of these monthly reports, which also included a statement of fatalities in the coal mines of the United States in

1910, was presented for discussion at the annual meeting of the Mine Inspectors' Institute of America at Columbus, Ohio, on June 18, 1912.

During the year many thousands of letters were addressed to the operators of metal mines and quarries asking for information concerning the accidents occurring during the previous year. To a majority of these letters replies have been received, but the returns have been so incomplete that before satisfactory records are in hand supplemental work will be necessary beyond the present force and facilities of the bureau.

The work thus far accomplished in the collection and publication of mine-accidents statistics was in charge of F. W. Horton, engineer, assisted by a clerk and temporary aids.

ADMINISTRATION.

FINANCIAL STATEMENT.

The total sum appropriated by Congress for expenditure by the Bureau of Mines during the fiscal year ended June 30, 1912, was \$475,000.

The following statement shows the appropriations made for the year and the amounts disbursed from each appropriation:

Amounts appropriated for and expended by the Bureau of Mines for the fiscal year ended June 30, 1912.

Title of appropriation.	Amount.	Repay-ments.	Available.	Disburse-ments.	Balance subject to voucher on claims.
General expenses.....	\$54,000.00		\$54,000.00	\$53,652.12	\$347.88
Investigating mine accidents.....	310,000.00	\$2,571.97	312,571.97	312,244.76	327.21
Testing fuels.....	100,000.00	977.54	100,977.54	100,733.15	244.39
Inspecting mines in the Territories.....	9,500.00		9,500.00	7,243.92	2,256.08
Books and publications.....	2,000.00		2,000.00	1,907.35	2.65
Total.....	475,500.00	3,549.51	479,049.51	475,871.30	3,178.21

Disbursements in Washington were made through the disbursing office of the Department of the Interior. Disbursements in Pittsburgh and all accounting at the experiment station and elsewhere in the field were in charge of F. E. McCalip, special disbursing agent, who prepared all pay rolls for the Pittsburgh plant, the experimental mine, the mine safety cars and stations, and elsewhere in the field.

CORRESPONDENCE AND RECORDS.

The work during the year at the headquarters of the bureau consisted partly of opening, referring, and filing the bureau's official correspondence and partly of preparing replies to inquiries for miscellaneous information and making up certain administrative reports.

The force engaged in this work consisted of a clerk in charge and two file and withdrawal clerks. Part of the time of one stenographer was also devoted to the work. Much of the time of this force was occupied with other clerical work of the bureau.

The number of official communications handled at the Washington office was about 100,000, or an increase of 40 per cent over that of the previous fiscal year. Exclusive of publications, and including all other classes of mail, the total mail of the bureau aggregated about half a million pieces.

At the Pittsburgh experiment station 35,000 letters, besides publications and other mail matter approximating 15,000 pieces, were received during the year. In all, approximately 45,000 pieces of mail were sent out from that station.

PERSONNEL.

On June 30, 1912, there were 274 employees holding secretary's appointments on duty in the Bureau of Mines and 30 on duty under field-employment agreements, making a total of 304 employees. Those holding Secretary's appointments were distributed and classified as indicated in the following table:

Employees in the Bureau of Mines on duty June 30, 1912.

Location.	Classification and number of employees.			
	Technical.	Clerical.	Nonclerical.	Total.
Washington.....	19	34	^a 21	74
Pittsburgh.....	78	31	^b 29	138
Field in general.....	58	4	.....	62
	155	69	50	274

^a Such as elevator man, electrician, watchman, charwoman, messenger boy, and the like.

^b Such as fireman, watchman, oiler, carpenter, shot firer, janitor, machinist's helper, and the like.

In addition to those included in the above table, 30 nonclerical employees, unskilled laborers and cooks, were engaged in the mine-accident investigations under temporary field agreements.

The record for the fiscal year shows an increase over the last year of 9 employees in the Washington office, 2 in the Pittsburgh office, and a decrease of 5 in the field in general, making a total increase of 6 employees only. There are, however, 44 more employees holding Secretary's appointments and 38 less under field agreements.

The total number of changes in status were 962, consisting of the appointment of 108 permanent appointees, 124 temporary appointees, and 179 employees on field agreements; the separation of 49 perma-

nent appointees, 133 temporary appointees, and 217 employees on field agreements; 56 extensions of limited appointments; 62 promotions and 2 reductions of Secretary's appointees; and transfers of salaries of 19 on field agreements. There were 6 failures to accept probationary appointments issued and 4 failures to accept temporary appointments.

Grants of leave were made during the past calendar year to 210 of the employees, as follows: Annual, 4,176 days; sick, 701 days; without pay, 989 days; furlough, 299 days. This leave was covered by approximately 1,387 applications.

PUBLICATIONS.

The Bureau of Mines publishes three classes of reports—bulletins, technical papers, and miners' circulars. In addition, the bureau publishes the annual report of the director and various lists, schedules, and statements. The bulletins present in a somewhat formal shape the record of investigations conducted by the bureau, hence they are of chief value to engineers, chemists, physicists, mine officials, mine workers, or other persons particularly interested in the subjects discussed. They are, as a rule, technical in character, have necessary illustrations, and are bound in paper. The technical papers are less formal, preliminary or brief statements of the results of investigations conducted in the bureau. They are published without covers and contain few illustrations. The miners' circulars are written in nontechnical English and deal with such topics as mine safety, the prevention of accidents, the safeguarding of health, and similar topics, all discussed from the standpoint of those who work in mines or quarries, or in some branch of the mineral industry. These, like the technical papers, usually contain only 10 to 30 pages and have no covers. They are printed in much larger editions than either the bulletins or technical papers.

Publications for the fiscal year ended June 30, 1912, are summarized below as follows:

BULLETINS.

Bulletin 6. Coals Available for the Manufacture of Illuminating Gas, by A. H. White and Perry Barker. 77 pp., 4 pls., 12 text figures.

Gives details of experiments conducted with coals from 11 States to determine the value of each coal as a source of illuminating gas.

Bulletin 10. The Use of Permissible Explosives, by J. J. Rutledge and Clarence Hall. 34 pp., 5 pls., 4 text figures.

Summarizes the results of field investigations made to ascertain the manner in which permissible explosives were being used or could be used to best advantage for blasting coal. Is intended especially for mine foremen, fire bosses, and mine officials generally. Contains suggestions on placing and charging holes and firing shots.

Bulletin 18. Résumé of Producer-Gas Investigations, October 1, 1904, to June 30, 1910, by R. H. Fernald and C. D. Smith. 893 pp., 12 pls., 250 text figures.

A detailed summary of the results obtained in the producer-gas investigations conducted by the Government fuel-testing plants during the period mentioned. The bulletin is intended especially for mechanical engineers and power-plant officials interested in gas-producer design and operation, and the suitability of gas producers for commercial operation on the grades of coal available at different points in the United States. The bulletin incidentally discusses the status of gas-producer development in this country and in Europe.

Bulletin 15. Investigations of Explosives Used in Coal Mining, by Clarence Hall, W. O. Snelling, and S. P. Howell, with a chapter on the Natural Gas Used at Pittsburgh, by G. A. Burrell, and an introduction by C. E. Munroe. 197 pp., 7 pls., 5 text figures.

This bulletin, though intended especially for explosives chemists, contains information of interest and value to all persons who have occasion to supervise the purchase or use of large quantities of explosives. Among the topics discussed are the thermochemistry of explosives, the equipment and methods used by the Bureau of Mines in making physical tests of explosives, the properties of the natural gas used by the bureau in certain of these tests, and the requirements that explosives must satisfy for inclusion in the list of permissible explosives issued by the bureau.

Bulletin 16. The Uses of Peat for Fuel and Other Purposes, by C. A. Davis. 214 pp., 1 pl., 1 text figure.

Summarizes current developments in the utilization of peat. Treats of the origin and formation of peat, the physical and chemical properties of peat as related to its fuel value, and the preparation and manufacture of peat fuel, including machine peat, peat briquets, peat coke, and peat gas. Also summarizes progress in utilizing peat for products other than fuel, such as ammonium compounds, packing material, and litter.

Bulletin 17. A Primer on Explosives for Coal Miners, by C. E. Munroe and Clarence Hall. 61 pp., 10 pls., 12 text figures.

Is intended for the use of coal miners. Discusses combustion and explosion, the composition of explosives, the handling and use of explosives and of squibs, fuse, and detonators, and concludes with notes on the safe shipment and storage of explosives and the requirements of permissible explosives. Reprint of United States Geological Survey Bulletin 423.

Bulletin 19. Physical and Chemical Properties of the Petroleum of the San Joaquin Valley, Cal., by I. C. Allen and W. A. Jacobs, with a chapter on "Analyses of natural gas from the southern California oil fields," by G. A. Burrell. 60 pp., 2 pls., 10 text figures.

Summarizes the methods used by the petroleum section of the Bureau of Mines in determining the heating value and other properties of the fuel products derived from the petroleum mentioned, and gives the results of the examination of a large number of samples. Also describes an electric still adapted for difficult distillations and briefly summarizes the methods used in analyzing the natural gases from wells in the southern California petroleum fields.

Bulletin 20. The Explosibility of Coal Dust, by G. S. Rice, with chapters by J. C. W. Frazer, Axel Larsen, Frank Haas, and Carl Scholz. 204 pp., 14 pls., 28 text figures.

A résumé of existing knowledge regarding the explosibility of coal dust suspended in air. Is written for the information of officials of coal-mining

companies and of persons investigating the properties of coal dust. Treats of the growth of the coal-dust problem in Europe and in this country, the manner in which coal dust is made in mines, the factors that govern the explosibility of coal dust, and the remedies that may be applied in mines to render coal dust harmless. Revision of United States Geological Survey Bulletin 425.

- Bulletin 21. The Significance of Drafts in Steam-Boiler Practice, by W. T. Ray and Henry Kreislinger. 64 pp., 26 text figures.

Summary of investigations undertaken to show the relationship between the resistance and the flow of air through fuel beds and boilers, and the capacity of boilers. Written for the information of power-plant engineers and designers of boilers. Reprint of United States Geological Survey Bulletin 367.

- Bulletin 23. Steaming Tests of Coals and Related Investigations, September 1, 1904, to December 31, 1908, by L. P. Breckenridge, Henry Kreislinger, and W. T. Ray. 380 pp., 2 pls., 94 text figures.

A comprehensive summary of the work done by the steam-engineering sections of the Government fuel-testing plants at St. Louis, Mo., and Norfolk, Va., during the period mentioned. Is especially intended for mechanical engineers, designers of boiler plants, and persons interested in the efficient utilization of coal under boilers. Summarizes the results of 551 steaming tests with a wide variety of coals and several different types of boilers; also the results of about 300 laboratory tests made to determine the principles governing heat absorption in boilers. Among the subjects discussed are the functions and efficiencies of furnaces and boilers, the effects of greater combustion, composition of the products of combustion, air supply, combustion of coal, the results of the tests, and the principles involved in the combustion of coal in boiler furnaces.

- Bulletin 24. Binders for Coal Briquets, by James E. Mills. 56 pp., 1 text figure.

Describes investigations made to determine the suitability of various substances as binders for coal briquets. Reprint of United States Geological Survey Bulletin 343.

- Bulletin 25. Mining Conditions Under the City of Scranton, Pennsylvania, report and maps, by William Griffith and E. T. Conner, with a preface by Joseph A. Holmes and a chapter by N. H. Darton. 89 pp., 29 pls.

Gives results of an investigation undertaken to determine the probable danger from subsidence of the surface by reason of the removal of coal from the various beds underlying the city. Shows by large-scale maps the extent of the workings in each bed. Discusses various methods used for supporting the roof, and commends the system of filling rooms and entries with material flushed in from the surface. In addition, contains notes on sources of sand available for flushing mines in the Scranton region. Is chiefly of local interest, but presents information of use in the solution of similar problems in other coal fields.

- Bulletin 26. Notes on Explosive Mine Gases and Dusts, with Especial Reference to Explosions in the Monongah, Darr, and Naomi Coal Mines, by R. T. Chamberlin. 383 pp., 1 text figure.

Describes the investigation made to determine the gases in coal, their quantity, and composition. Discusses factors governing the escape of gas in mines and the part played by coal dust in three great mine disasters. Reprint of United States Geological Survey Bulletin 383.

- Bulletin 27. Tests of Coal and Briquets as Fuel for House-Heating Boilers, by D. T. Randall. 44 pp., 3 pls., 2 text figures.

- Gives the results of several series of tests on a variety of coals and presents data for determining the relative value of fuels for use in house-heating boilers. This is a reprint of United States Geological Survey Bulletin 306.
- Bulletin 28. Experimental Work Conducted in the Chemical Laboratory of the United States Fuel-Testing Plant at St. Louis, Mo., January 1, 1905, to July 31, 1906, by N. W. Lord. 51 pp.
- Discusses factors affecting the accuracy of the analyses of coal under or by the methods used at the fuel-testing plant in St. Louis. Reprint of United States Geological Survey Bulletin 323.
- Bulletin 29. The Effect of Oxygen in Coal, by David White. 80 pp., 3 pls.
- Compares the composition, especially the oxygen content, of a large number of coals in its relation to the calorific value of a given coal. Discusses the causes of the variation in oxygen content and the relation of the original constituents of coals to coking properties. Is intended for chemists, geologists, and fuel engineers. Reprint of United States Geological Survey Bulletin 332.
- Bulletin 30. Briquetting Tests at the United States Fuel-Testing Plant, Norfolk, Va., 1907-8, by C. L. Wright. 41 pp., 9 pls.
- Describes the two types of presses used in the tests and the results obtained with 15 different coals. Reprint United States Geological Survey Bulletin 385.
- Bulletin 31. Incidental Problems in Gas-Producer Tests, by C. D. Smith, J. K. Clement, and H. A. Grine. 29 pp., 8 text figures.
- Considers the factors affecting the proper length of gas-producer tests and the differences in temperature at different points in the fuel bed. Reprint of United States Geological Survey Bulletin 393.
- Bulletin 32. Commercial Deductions from Comparisons of Gasoline and Alcohol Tests of Internal-Combustion Engines, by R. M. Strong. 38 pp.
- Summarizes results obtained from 2,000 tests of gasoline and alcohol as fuel for internal-combustion engines. Reprint of United States Geological Survey Bulletin 392.
- Bulletin 33. Comparative Tests of Run-of-Mine and Briquetted Coal on the Torpedo Boat *Biddle*, by W. T. Ray and Henry Kreisinger. 50 pp., 10 text figures.
- Describes the boiler and the appliances and methods used in the tests. Calls attention to the importance of large combustion space in burning smoky coals. Reprint of United States Geological Survey Bulletin 403.
- Bulletin 34. Tests of Run-of-Mine and Briquetted Coal in a Locomotive Boiler, by W. T. Ray and Henry Kreisinger. 32 pp., 9 text figures.
- Describes the construction of the boiler and the methods used in the tests. Gives suggestions as to possible methods of increasing the capacity of locomotive boilers. Reprint of United States Geological Survey Bulletin 412.
- Bulletin 35. The Utilization of Fuel in Locomotive Practice, by W. F. M. Goss. 29 pp., 8 text figures.
- Discusses the results of tests bearing on the heat lost and utilized from the fuel burned in locomotive boilers. Gives some general conclusions as to the probable economies to be effected. Reprint of United States Geological Survey Bulletin 402.
- Bulletin 36. Alaskan Coal Problems, by Walter L. Fisher. 32 pp., 1 pl.
- Summary of existing knowledge regarding the areal extent of the Alaskan coal fields, the quality of the coal, its suitability for various purposes, and the probable market for it.
- Bulletin 37. Comparative Tests of Run-of-Mine and Briquetted Coal on Locomotives, Including Torpedo-Boat Tests, and Some Foreign Specifications for Briquetted Fuel, by W. F. M. Goss. 58 pp., 4 pls., 35 text figures.

Discusses the use of briquets in Germany, Belgium, and France, and the results of some comparative tests of a Pennsylvania bituminous coal, in run-of-mine form and in briquets. Reprint of United States Geological Survey Bulletin 363.

Bulletin 39. The Smoke Problem at Boiler Plants, a Preliminary Report, by D. T. Randall.

Discusses general conditions at boiler plants in the United States, the smoke ordinances of various cities, the factors that cause smoke, and the methods of insuring smoke abatement. Revision, by S. B. Flagg, of United States Geological Survey Bulletin 334. 31 pp.

Bulletin 40. The Smokeless Combustion of Coal in Boiler Furnaces, with a chapter on "Central heating plants," by D. T. Randall and H. W. Weeks.

Describes results of a field investigation of a large number of boiler plants situated in different cities. Gives details of the furnaces and boilers used at these plants and the methods of firing. Also gives the results of tests made at the Government fuel-testing plants at St. Louis, Mo., and Norfolk, Va., to determine the factors governing the production of smoke. Presents a summarized statement regarding central heating plants in the United States. Revision by Henry Kreislinger, of United States Geological Survey Bulletin 373. 188 pp., 40 text figures.

Bulletin 41. Government Coal Purchases under Specifications, with Analyses for the Fiscal Year 1909-10, by G. S. Pope, with a chapter on "The fuel-inspection laboratory of the Bureau of Mines," by J. D. Davis. 97 pp., 3 pls., 9 text figures.

Discusses the value of coal as fuel, the advantages of definite specifications for purchasing coal, and the Government as a coal purchaser. Gives heating value of a large number of coals used at Government power plants, and the proximate analyses of most of these coals.

TECHNICAL PAPERS.

Technical Paper 3. Specifications for the Purchase of Fuel Oil for the Government, with Directions for Sampling Oil and Natural Gas, by I. C. Allen. 13 pp.

Presents specifications stating the physical properties, heating value, and general condition of fuel oil to be purchased by the Government and provisions for varying the price paid according to the quality of deliveries; also summarizes the methods used by the Bureau of Mines in sampling oil and natural gas.

Technical Paper 4. The Electrical Section of the Bureau of Mines; Its Purpose and Equipment, by H. H. Clark. 12 pp.

Briefly describes the more notable features of the equipment of the electrical laboratory of the Bureau of Mines, Pittsburgh, Pa.; the purpose of the investigations made at this laboratory and their bearing on safety in mining, and gives some details of investigations already conducted.

Technical Paper 5. Constituents of Coal Soluble in Phenol, by J. C. W. Frazer and E. J. Hoffman. 20 pp., 1 pl.

A preliminary statement of an investigation of the nature of the chemical compounds in coal. Describes the compounds obtained by extracting coal with phenol and isolating fractions by the use of different solvents.

Technical Paper 6. The Rate of Burning of Fuse as Influenced by Temperature and Pressure, by W. O. Snelling and W. C. Cope. 28 pp.

Discusses the composition of fuse used by miners and the effects of differences of pressure, temperature, etc., on the normal rate of burning.

Technical Paper 7. Investigations of Fuse and Miners' Squibs, by Clarence Hall and S. P. Howell. 19 pp.

- Discusses the essential features of squibs and miners' fuse and gives the results of experiments showing the weight of powder per foot in the various grades of fuse, the composition of this powder, the nature of the gaseous products of combustion, and the efficiency of split of the samples tested. Gives also salient features of specifications adopted by the Government for the purchase of fuse for use on the Canal Zone and presents suggestions regarding the transportation, storage, and use of fuse.

Technical Paper 8. Methods of Analyzing Coal and Coke, by F. H. Stanton and A. C. Fieldner. 21 pp., 5 text figures.

Gives the methods used by the laboratory of the Bureau of Mines for analyzing coal and coke for determining the heating value and the specific gravity of these fuels.

Technical Paper 9. The Status of the Gas Producer and the Internal-Combustion Engine in the Utilization of Fuels, by R. H. Fernald. 42 pp., 6 text figures.

Summarizes the more noteworthy developments in gas-producer design and the application of the gas producer to commercial uses. Also points out the notable features of recent progress in the development of gas power.

Technical Paper 10. Liquefied Products of Natural Gas, Their Properties and Uses, by I. C. Allen and G. A. Burrell. 23 pp.

Briefly summarizes the history of attempts to liquefy certain constituents of natural gas, the composition of the crude natural gas, and the results of some experiments made by the Bureau of Mines in liquefying gas and in determining the value of the products obtained.

Technical Paper 11. The Use of Mice and Birds for Detecting Carbon Monoxide After Mine Fires and Explosions, by G. A. Burrell. 15 pp.

Discusses the occurrence, properties, and physiological effects of carbon monoxide—a common constituent of the afterdamp from mine fires and explosions—and the results of experiments with mice and birds, showing the value of these animals as indicators of this poisonous gas to parties exploring mines.

Technical Paper 12. The Behavior of Nitroglycerin When Heated, by W. O. Snelling and C. G. Storm. 14 pp., 1 pl., 2 text figures.

Gives results of experiments which show that previous determinations of the boiling point of nitroglycerin have been inaccurate and describes the apparatus used in the experiments.

Technical Paper 13. Gas Analysis as an Aid in Fighting Mine Fires, by G. A. Burrell and F. M. Seibert. 16 pp., 1 text figure.

The authors point out the value of gas analysis in showing the composition of mine atmospheres and the conditions in fire areas of burning mines. Describes a portable apparatus for the analysis of mine gases.

Technical Paper 16. Deterioration and Spontaneous Combustion of Coal in Storage, a Preliminary Report, by H. C. Porter and F. K. Ovitz. 14 pp.

The authors review opinions previously held regarding the deterioration and spontaneous heating of coal and describe the results of their investigations. These results show that for many coals the loss by the escape of volatile matter is much less than has been generally supposed, and that fine subdivision and alternate wetting and drying facilitate spontaneous heating.

Technical Paper 19. The Factor of Safety in Mine Electrical Installations, by H. H. Clark. 14 pp.

The author points out the factors that tend to make electrical installations less safe in mines than above ground, the three possible dangers—shock, fires, and explosions—from the use of electrical equipment, and gives some general suggestions regarding the adoption and maintenance of a high factor of safety in electrical installations.

Technical Paper 20. The Slagging Type of Gas Producer, with a Brief Report of Preliminary Tests, by C. D. Smith. 14 pp., 1 pl.

Discusses briefly some of the experiments made by the Bureau of Mines with a special producer designed for fluxing the ash and removing it as liquid slag.

Technical Paper 21. The Prevention of Mine Explosions, Report and Recommendations, by Victor Watteyne, Carl Meissner, and Arthur Desborough. 12 pp.

Gives the recommendations of three prominent foreign coal-mining experts as to matters of safety in coal mining in the United States after visits to typical mines in 1908. Reprint of United States Geological Survey Bulletin 369.

Technical Paper 23. Ignition of Gas by Miniature Electric Lamps with Tungsten Filaments, by H. H. Clark. 5 pp.

Briefly summarizes results of experiments to determine the effect of breaking the bulbs of miniature electric lamps in the presence of explosive mixtures of gas and air.

MINERS' CIRCULARS.

Miners' Circular 5. Electrical Accidents in Mines, Their Causes and Prevention, by H. H. Clark, W. D. Roberts, L. C. Ilsley, and H. J. Randolph. 10 pp., 8 pls.

Defines various electrical terms. Discusses the chances of electrical shock in mines, and presents suggestions as to measures that mine foremen, mine electricians, and miners should take to prevent electrical accidents. Also gives directions for the treatment of shock.

Miners' Circular 6. Permissible Explosives Tested prior to January 1, 1912, and Precautions to be Observed in their Use, by Clarence Hall. 20 pp.

States the test requirements for permissible explosives; presents a list of these explosives, and discusses their classification, rate of detonation, and their suitability for particular purposes. Also gives general precautions to be observed by miners and others in storing, thawing, handling, and using explosives.

EDITORIAL WORK.

The bureau published during the year 27 bulletins, 16 technical papers, and 3 miners' circulars. The contents of these publications have been summarized in the preceding list. In brief, the reports are as follows: Bulletins 6, 10, 13, 15, 16, 17, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, and 41; Technical Papers 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 19, 20, 21, and 23; Miners' Circulars 4, 5, and 6; first annual report of the director.

A number of the publications were revised and reprinted. Five editions of one of the miners' circulars were issued.

In addition to the regular classes of reports, the bureau issued several lists of publications and various statements relating to the progress of its investigations.

The editorial section not only edits texts of all publications, but also examines all material submitted for illustrations and has the accepted material prepared for engraving. The work of redrawing and relettering diagrams and charts and of retouching photographs took less than half the time of one draftsman. The work was done

under the direction of the editors, who determined the size of the illustrations, their character (whether text figures or plates), and the process (zinc etching, wax engraving, etc.) used in reproducing them.

The editorial work was in charge of S. Sanford, engineer. One editorial assistant was employed throughout the year and another during half of the year.

DISTRIBUTION OF PUBLICATIONS.

The public demand for the publications of the Bureau of Mines during the fiscal year ended June 30, 1912, the second year of the bureau, went beyond all expectations. So numerous were the calls for the various publications that the necessary reprints were obtained with difficulty from the Printing Office in time to supply this demand.

Altogether more than half a million publications were distributed, including bulletins, miners' circulars, technical papers, and the annual report. During the first fiscal year the entire distribution amounted to 110,504, making the gain for the past fiscal year 359 per cent. Following is a comparison of the distribution of publications of the bureau during the two years:

Distribution of publications during past two years.

Kind of publication.	Number distributed in—	
	1910-11	1911-12
Bulletins.....	36,020	96,762
Technical papers.....	5,155	56,903
Miners' circulars.....	69,329	351,849
Annual report.....	0	2,022
Total.....	110,504	507,536

The distribution of publications was in charge of J. L. Cochrane.

LIBRARY.

The bureau has only the beginning of a library, consisting of some 3,000 volumes of technical books, which are kept mainly at the experiment station at Pittsburgh. Its need for larger library facilities exceeds that of most other branches of the Government service, because of the fact that nearly all of its technical work is done outside of Washington and away from the general libraries built up at the Capital. Its inquiries and investigations are seriously handicapped by the lack of technical books and periodicals, not only at Pittsburgh, but at the Washington headquarters and at different points in the field where the engineers and other employees of the bureau are required to carry on their work.

At the Washington headquarters are kept only a few general reference books, a few duplicates obtained by exchange, and a few technical books necessary to the researches carried on in the Washington laboratories.

No books are purchased by the bureau, except such as are required in its technical inquiries and researches.

COMPUTING, DRAFTING, AND PHOTOGRAPHY.

The work of the year included the computation of results of all tests, the preparation of designs for new equipment and apparatus at Pittsburgh, and the preparation of illustrations for publication and for custody as records.

The work outlined above was done at the Pittsburgh station, and was in charge of Lauson Stone, engineer, assisted by R. A. Wood.

The computing force, consisting of one mechanical engineer, two civil engineers, and one chemist, was engaged in the reduction of test data from various investigations. The drafting force, which consists of one mechanical draftsman and one mining draftsman, prepared drawings of buildings and equipment, designed new testing equipment and instruments, and made line drawings and mine maps.

The photographic force consists of one photographer and one photographic aid. It kept photographic records of equipment, methods of work, etc., and developed negatives taken by engineers and chemists in the field. Sets of lantern slides were supplied to each of the mine-safety cars for use in the field and to the engineers of the bureau for use in their demonstrational work.

The following tabulation presents approximately two-thirds of the work done; the remainder consisted of the tabulations and revisions involved in keeping the records current:

Computing, drafting, and photographic work of the year.

Fuel-test computations:

Steaming	80
House heating	92
Gas producer	16
Special furnace	31
Gas analyses	79
Coal analyses, complete	1,483
Calorimeter computations	* 754
Physical tests of explosives	6,070
Drawings	270
Blue prints	3,906
Negatives	827
Photographic prints	11,600
Lantern slides	1,813
Film rolls	67

* Represents six months only.

**REPORT OF THE GOVERNMENT HOSPITAL
FOR THE INSANE.**

493

OFFICERS OF THE HOSPITAL.

BOARD OF VISITORS.

Brig. Gen. GEO. M. STERNBERG, U. S. A., <i>President of the Board.</i>	Brig. Gen. GEO. H. TORNEY, Surgeon General, U. S. A.
Mrs. HENRY G. SHARPE.	Mr. JOHN W. YERKES.
Miss BESSIE J. KIBBEY.	WALTER S. HARRAN, D. D. S.
WALTER WYMAN, M. D., ¹	RUPERT BLUE, M. D.,
<i>Surgeon General, P. H. and M. H. S.</i>	<i>Surgeon General, P. H. and M. H. S.</i>
Rev. JOHN M. SCHICK, D. D.	
Dr. CHARLES F. STOKES, Surgeon Gen- eral, U. S. N.	

Executive Committee of the Board.

Dr. STERNBERG, Mrs. SHARPE, Mr. SCHICK.

Chaplains.

Rev. C. H. BUTLER.	Rev. C. M. BART.
Rev. W. G. DAVENPORT.	Rev. HUGH T. STEVENSON.
Rev. GEO. M. CUMMINGS.	

MEDICAL STAFF.

Superintendent.

WILLIAM A. WHITE, M. D.

First Assistant Physician.

GEO. H. SCHWINN, M. D.

Senior Assistant Physicians.

MARY O'MALLEY, M. D.	FRANCIS M. BARNES, Jr., M. D.
BERNARD GLUECK, M. D.	

Assistant Physicians.

ALFRED GLASCOCK, M. D.	NICHOLAS J. DYNAN, M. D.
WILLIAM H. HOUGH, M. D.	EVA C. REID, M. D.

Junior Assistant Physicians.

MYER SOLOMON, M. D. ²	JOHN H. THORNE, M. D.
M. EDITH CONSER, M. D. ²	SAMUEL W. McEWAN, M. D.
JAMES J. LOUGHRAN, M. D.	GRACE DE WITT, M. D.
JOHN A. PFEIFFER, M. D.	

Medical Internes.

HALBERT ROBINSON, M. D. ²	HYMAN LAVESON, M. D. ²
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Scientific Director.

S. I. FRANZ, A. B., Ph. D.

Histopathologist.

GONZALO R. LAFORA.

¹ Deceased. Succeeded by Dr. Rupert Blue.

² Resigned.

OFFICERS OF THE HOSPITAL.

Assistants in Psychology.MISS GRACE H. KENT, Ph. D.¹

EDWIN G. BORING, A. B.

Visiting Dentist.

A. D. WEAKLEY, D. D. S.

Dental Interne.

CHARLES R. IRBY, D. D. S.

Visiting Ophthalmologist.

ARTHUR H. KIMBALL.

Veterinarian.

JOHN P. TURNER, V. D. M.

Steward and Disbursing Agent.

MONIE SANGER.

Chief Clerk.

FRANK M. FINOTTL.

Purchasing Agent.

A. E. OFFUTT.

Matron.

H. O'BRIEN.

Chief of Training School.

JOSEPHINE I. STRANSKY, M. D.

CONSULTING STAFF.**Internal Medicine.**

Dr. S. S. ADAMS.

Dr. G. W. COOK.

Dr. STERLING RUFFIN.

Dr. JAMES D. MORGAN.

General Surgery.

Lieut. Col. WM. H. ARTHUR, U. S. A.

Dr. G. T. VAUGHN.

Dr. W. P. CARR.

Gynecology.

Dr. JOSEPH TABER JOHNSON.

Dr. H. L. E. JOHNSON.

Dr. J. W. BOVÉ.

Dr. I. S. STONE.

Ophthalmology.

Dr. D. K. SHUTE.

Dr. W. K. BUTLER.

Laryngology.

Dr. C. W. RICHARDSON.

Dr. J. J. RICHARDSON.

Dr. W. A. WELLS.

Dr. F. T. CHAMBERLIN.

Genito-urinary Diseases.

Dr. E. F. KING.

Dr. WALLACE NEFF.

Medical Zoology.

Dr. C. W. STILES.

Dr. THOMAS A. CLAYTOR.

Bacteriology.

Dr. H. D. GIDDINGS.

Dermatology.

Dr. RANDOLPH BRYAN CARMICHAEL.

¹ Resigned.

REPORT OF THE GOVERNMENT HOSPITAL FOR THE INSANE.

WASHINGTON, D. C., *July 1, 1912.*

SIR: The Board of Visitors for the Government Hospital for the Insane have the honor to submit the fifty-seventh annual report of the hospital, consisting of the report of the superintendent for the fiscal year ended June 30, 1912, and his recommendations.

Respectfully,

GEO. M. STERNBERG,
President of the Board of Visitors.

WM. A. WHITE, M. D.,
Superintendent, Secretary of the Board ex officio.

The SECRETARY OF THE INTERIOR.

REPORT OF THE SUPERINTENDENT.

MOVEMENTS OF POPULATION.

On June 30, 1912, there were remaining in the hospital 2,898 patients, as against 2,862 remaining on June 30, 1911, an increase of 36 over the previous year. There were admitted during the year 733 patients, an increase of 110 over the previous year. The total number of patients treated during the year was 3,595, an increase of 56 over the previous year. The number of discharges during the year, including deaths, was 697, an increase of 20 over the previous year. The daily average population was 2,871.75, as against 2,884 for the previous year, a decrease of 12.25.

The slow increase of the population of the hospital during the past two years, amounting to an almost stationary condition of the census, was due to the rather remarkable fact that efforts were made contemporaneously in connection with several of the sources of supply to keep down the admission rate. This is particularly true of the District of Columbia and the Army. Considerably greater activity on the part of the District of Columbia has also been manifested during recent months in deporting nonresidents.

When we note, however, that the number of admissions for the year amounts to 733, having been exceeded only upon two previous occasions, namely, in 1902-3, when the admissions were only 734, and in 1903-4, when there were 766, the years following closely upon the Spanish-American War and the occupation of the Philippines, it will be seen that a considerably more rapid increase in the population of the hospital is to be expected from now on.

Movement of population, fiscal year ended June 30, 1912.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Remaining June 30, 1911.....	1,733	383	478	268	2,852
Admitted during the year.....	455	88	110	80	733
Total number under treatment.....	2,188	471	588	348	3,506
Discharged:					
Recovered.....	92	14	21	19	146
Improved.....	25	8	10	9	52
Unimproved.....	65	7	22	8	102
Not insane.....	45	9	6	5	65
Died.....	199	59	43	31	332
Total.....	426	97	102	73	697
Remaining June 30, 1912.....	1,762	374	486	276	2,896

ADMINISTRATIVE DEPARTMENT.

OFFICE OF STEWARD AND DISBURSING AGENT.

Farm and garden products raised during the year ended June 30, 1912.

Apples:		Hay:	
Crab.....bushels..	84	Clover.....tons..	102
Green.....do.....	260	Rye.....do.....	17
Beans:		Oat.....do.....	6
Lima.....do.....	85	Timothy.....do.....	1
String.....barrels..	124	Honey.....barrels..	37
Beets:		Kale.....do.....	303
In bunches.....	3,232	Lettuce.....heads..	11,143
In bushels.....	120	Milk.....gallons..	114,377
Cabbage.....heads..	1,135	Onions, dried.....barrels..	2
Cabbage sprouts.....barrels..	329	Onions, green.....bunches..	26,274
Cantaloupes.....	5,620	Oyster plants.....do.....	480
Carrots.....bunches..	3,195	Parsley.....do.....	16,280
Celery.....do.....	3,634	Parsnips.....barrels..	32
Cherries.....quarts..	727	Peaches.....bushels..	2
Chickens.....pounds..	330	Pears.....do.....	232
Corn:		Pens.....do.....	71
Green.....ears.....	29,047	Peppers.....do.....	45
Fodder, green.....tons..	462	Plums.....do.....	15
Ear.....barrels..	115	Potatoes:	
Shelled.....bushels..	92	Irish.....do.....	72
Cowpeas.....tons.....	211	Sweet.....do.....	508
Cucumbers.....	5,536	Pork, fresh.....pounds..	30,743
Currants.....quarts..	134	Pumpkins.....	838
Eggplants.....	3,072	Radishes.....bunches..	19,275
Eggs.....dozen.....	5,007	Spinach.....barrels..	15
Figs.....bushel.....	1	Squash.....	3,232
Fodder, dry.....tons..	48	Straw, rye.....tons..	14
Grapes.....pounds..	9,779	Tomatoes.....bushels..	827
Grass, green.....tons..	20	Turnips.....do.....	1,097
		Watermelons.....	1,848

Work done in mattress shop during the year ended June 30, 1912.

Mattresses made and made over.....	1,071	Pillows made and made over...	1,088
Mats made:		Pads, knee, made.....	12
Drawn.....	48	Pads, cart saddle, made.....	4
Braided.....	105	Hair renovated.....pounds..	27,400
Husk.....	10	Clothing repaired.....pieces..	725
		Hose repaired.....pairs..	855

Work of sewing and mending rooms during the year ended June 30, 1912.

ARTICLES MANUFACTURED.

Aprons:		Dresses:	
Barber	5	Cashmere	1
Dining room	75	Denim	178
Gingham	213	Gingham	1,077
White	1,079	Night—	
Bags:		Long	369
Sand	2	Short	792
Clothes	12	Percale	236
Jelly	4	Gowns:	
Bedsides, canvas	6	Operating	12
Bibs	78	Rubber bath	1
Blouses	672	Jackets, boys'	10
Caps:		Leggins	12
Cotton	2	Mittens	12
Dairy	36	Napkins, sanitary	469
Rubber	18	Pants:	
Cases, pillow	4,747	Boys'	26
Cases, pillow, rubber	1	Dairy	36
Chemise	761	Jean	1,759
Cloths, table:		Overall	953
Long	233	Soldiers'	803
Short	255	Petticoats	761
Coats:		Sheets:	
Surgeons'	5	Double	90
Citizens'	1,068	Single	6,040
Dairy	36	Shirts:	
Overall	504	Canton flannel	2,220
Corner pieces	2	Check	3,410
Covers:		Night	956
Bureau	309	Shirtwaists, percale	4
Car	48	Skirts:	
Chair	1	Denim	4
Corset	15	Gingham	2
Couch	10	Percale	2
Cushion	3	Starchers, collar and cuff	36
Piano	1	Strainers, linen	40
Screen	278	Strops, razor	6
Sideboard	32	Suits, union duck	8
Sofa	3	Ticks:	
Stand	689	Mattresses—	
Table	9	Double	3
Curtains:		Single	310
Holland	698	Pillow	216
Sash	28	Towels:	
Swiss	76	Bath	3,762
Drawers:		Roller	1,739
Boys'	25	Tea	1,976
Men's canton flannel	2,787	Tubs, canvas bath	2
Men's cotton	41	Vests, jean	311
Women's cotton	486	Waists, boys'	36

REPAIRS AND MISCELLANEOUS WORK.

Aprons made	237	Names sewed on	9,633
Bags, laundry, made	393	Napkins hemmed	1,243
Blankets, hemmed	1,115	Rugs made	54
Gloves made	346	Suits cleaned and pressed	44
Miscellaneous repairs	44,466		

WORK DONE FOR PATIENTS FROM FURNISHED MATERIAL.

Aprons	18	Petticoats	3
Drawers	4	Shirtwaists	2
Dresses	62		

Output of the bakery during the year ended June 30, 1912.

Bread:		Cake:	
Graham.....loaves..	24, 809	Coffee.....pounds..	5, 505
Ginger.....pounds..	4, 414	Currant.....do.....	880
Wheat.....loaves..	819, 785	Fruit.....do.....	1, 291
Doughnuts.....	4, 016	Marble.....do.....	1, 850
Pies.....	37, 479	Plain.....do.....	25, 931
Pudding, cottage.....pounds..	9,534	Raisin.....do.....	476
Rolls, morning.....	2, 248, 176		

Work of harness and shoemaker during the year ended June 30, 1912.

Shoes repaired.....pairs..	935	Harness repaired.....pieces..	275
Miscellaneous repairs.....articles..	60		

Articles made in the tin shop during the year ended June 30, 1912.

Boilers, oval.....	9	Measures, gallon.....	7
Boxes:		Molds, ice cream.....	37
Food.....	51	Miscellaneous.....	53
Knife.....	2	Pans:	
Buckets.....	9	Large.....	11
Cans, oil.....	6	Commode.....	23
Carriers, food.....	12	Dish.....	1
Crates:		Drip.....	12
Meat.....	18	Scoops.....	13
Potato.....	8	Spouting.....feet..	460
Cutters, biscuit.....	12	Trays, food.....	10
Elbows.....	60	Tureens, soup.....	38

All general repairs to roofs and gutters and kitchen ranges were made. Kitchen utensils were kept in repair and general run of tinner's work done throughout the departments of the hospital.

During the past year the main hall in the Center Building has been practically remodeled. The main stairway in the center of the hall and the small one in the rear of the building have been torn down and these places refloored and replastered. This has improved the main hall and shows the full length without any obstruction. The linoleum has been pieced, covering up all vacant spaces, and new settees, made in the institution, line both walls. The second floor of the Old Center has been remodeled, carrying out the idea from the first floor, and partitions erected separating entirely the stairways passing to the floors above and the wards on each side.

Spruce ward and annex have been entirely repainted, improving the appearance and the sanitary condition. The following wards have been painted, making quite an improvement in the appearance, besides being a preservative and making them far more sanitary: Dawes 3, West Lodge 2, Oaks B, general and superintendent's kitchen, some portions of Toner Building, Oaks E, Atkins Hall, as well as many of the roofs of the buildings.

With a view to locating the permanent entrance to the hospital grounds at a point about 200 feet north of the present south entrance, a road has been graded and paved with brick to the new location, and an inset has been provided for in the wall. About 550 feet of the old wooden fence around the Allison group, which was in bad repair, has been replaced with a wire fence. About 950 linear feet of concrete walk 5 feet wide has been laid, and about 1,700 linear feet of granite curb and 1,300 linear feet of old cobble gutter has been replaced by brick gutters.

The old milk room in the storehouse building has been remodeled and the new pasteurizer completely installed and has been in use for some time. All suggestions and regulations in reference to keeping our milk entirely free from the possibility of any class of germs can now be carried out, and in fact an analysis of our milk was made by the Bureau of Animal Industry, Department of Agriculture, and the report therefrom was very satisfactory. This report showed that the milk before pasteurizing contained approximately 100,000 germs and after pasteurizing only 10,000.

The annual tuberculin test of the cattle of our herd took place in December and January, and for the second successive year all passed without any reaction. The milk production has increased during the past year from 104,000 to 114,000 gallons, a net increase of approximately 10,000 gallons a year.

Hog cholera has become prevalent in this vicinity for the major portion of last year, and despite our efforts it at last attacked several of our hogs. After consulting with the veterinarian, it was deemed advisable to kill off all those of sufficient size to be used. An agricultural expert was consulted, and he at once vaccinated the others, thus immunizing them from possibility of being attacked by the disease.

During the past year there were turned into the storeroom 30,743 pounds of fresh pork. We still have on hand approximately 150 hogs.

New troughs have been constructed for use in the piggery and we have done what we could to make it sanitary, but owing to its dilapidated condition it was not deemed advisable to spend much labor and material on this building. A new one has been estimated for, and it is hoped that Congress will see its way clear to make this appropriation.

The work of strengthening the guards in the windows and doors of Howard Hall has been completed and additional tool-proof guards have been placed in position. The doors have all been reinforced and peepholes placed therein, so that attendants passing up and down the corridors may observe all going on inside without entering. Iron plates have been put on over face of locks and iron keeps, thus preventing possibility of picking the locks and getting out in this manner. This building is probably in as safe condition as it can be placed without erecting walls around it, which has been estimated for, and we hope Congress will grant it at this session.

A direct steam heating system has been installed in "R" Building. This building has long been noted as one of the coldest in the institution, but after this change it was made very comfortable for the patients. Radiators have been placed in the porches of Oaks A, which have been inclosed, and Allison C-1.

Eight wells have been cleaned out, and this resulted in an increase of water from 535,000 gallons to 727,000 gallons a day, a net increase of 192,000 gallons of water per day.

New heads and pistons have been placed on two of the largest air compressors and piston rods on the water ends of the D'Auria pumps. Considerable brickwork has been done on all the boilers and patches made on Nos. 3 and 4 boilers and on the locomotive. Smokestack for Nos. 3 and 4 boilers was renewed above the roof. Feed line to boilers has been reconstructed. A 12-inch sewer line has been laid from the pump house to the pond for drainage, made necessary by the flooding up of the flats. The compound Duplex pump has been

removed from the pump house and installed in the ice plant and connected with a tank removed from the old boiler house in such a manner as to operate kitchen and storehouse elevators and supply water for ammonia condensers of ice plant with river water. This reduces the amount of artesian water used, which facilitates the operating conditions at the pumping station.

All of the furnaces of boilers in the old boiler house have been repaired and all the tubes in the boilers cleaned. A number of tubes were placed in the Heine boilers as needed. T-Tyle is being placed on several of the boilers. A drip line in the basement of the power house has been reconstructed and all engine separators connected with the same direct, thus eliminating the steam traps on each engine. New sets of tubes have been installed in the hot-water heater at the laundry.

There has been considerable trouble in the laundry building as a result of the amount of steam in the very cold weather, and this was remedied by transferring old exhaust fan which was in the roof of the old laundry next to the Center Lodge into the wash room of the laundry.

The lavatory and toilet facilities in the laundry department have been thoroughly overhauled and new closets placed on each of the three floors and bathtubs on the third floor. This gives more privacy and better facilities and improves the sanitary conditions to a marked extent.

The water tower and tank at the lower farm collapsed last winter, due to an accumulation of ice caused by the tank leaking. As a temporary arrangement, in order that water could be supplied, two new galvanized-iron tanks were placed on the windmill tower over the well. A new tank has been purchased, and as soon as received will be erected on a new tower.

The following wards and buildings have been wired in iron-armored conduit: Allison D, Atkins Hall, Burrows Cottage, Dix 1, 2, and 3, East Lodge, fire-engine house, gatehouse, Rest, Retreat 1, Center Lodge, the old laundry building, Toner Building, Allison B, and Allison A partly. It will take approximately one year to complete the rewiring. All transformers ordered for electrical purposes have been received, installed, and connected up to supply practically all of the female and Richardson group of buildings. Alternating current has been supplied to all of these for a short time for test purposes.

Chain drives have been contracted for for the alternating current, heating, and ventilating motors in the B Building, which will be at once tested out under actual service conditions. It has been deemed advisable to make this test in one building before ordering alternating-current motors for this work in all buildings where direct-current motors are now used for this class of service.

All the windows in the female nurses' home have been changed from the old style loxtis to weights, and are now in such condition that they can be easily raised and lowered. This change will probably add to the ventilation of the place.

Settees have been made for Howard Hall, Retreat 1 and 2, P and Q Buildings. Storage cases were made for use in the record room instead of purchasing new ones, as formerly.

A new cowshed was built to take care of the increased number of cows on hand. New floors were laid in L Building, the Female Home, and the milk room, and one at present is being laid in B Building.

A careful inspection was made of the fire hose and a good deal of it condemned and replaced by new hose, and in addition thereto 4,700 feet of linen hose has been attached to standpipes in the various wards with nozzles to 37 outlets.

Several hundred new books have been purchased for the patients' library, which now has an average circulation of about 1,000 volumes. It is hoped not only to replace some of the worn-out ones by new ones, but to add some additional volumes in the very near future.

A workroom has been opened in Garfield basement, in charge of one attendant, and patients from the Howard Hall department employ their time there in caning chairs and repairing various articles of clothing.

Trees have been transplanted from the nursery to the triangle near the C Building, to the grounds around the pathological department, in the vicinity of J and K Buildings, and the grounds around the Richardson group of buildings.

The President's Efficiency and Economy Commission has been continuing its investigations and preliminary reports of same have been made to the Congress of the United States. In reference to this a representative of this commission spent several weeks in the institution going over our accounts and writing up a brief statement of same as a basis of future action by this commission. This statement was submitted to us for our approval, and it seemed to cover the condition of the records and accounts as in use in this institution.

WARD SERVICE.

The employees' quarters in Center Lodge were vacated and converted into two small dormitories having a capacity of 15 beds. This number of patients was transferred from Oaks B to these dormitories, thus relieving the overcrowded condition to some extent on that ward.

The old baggage room beneath Walnut and Oak wards has been entirely overhauled, much of the old baggage condemned, and the whole place rearranged and put in good order.

Birch ward has been made a hospital ward and the capacity increased from 25 to 35 beds, made possible by converting the sitting room into a dormitory. The ward has been placed in charge of a female nurse, assisted by one male and two female attendants. A male nurse has been placed in charge at night. This change was made necessary because of the increasing number of feeble and bed-ridden patients admitted to the receiving service who could not be cared for in other hospital wards because of lack of space.

The Training School for Nurses graduated 7 male and 10 female nurses in June. Seven men and 10 women were promoted from the junior class to the senior class of the training school.

During the course of the year the chef gave a course of lectures on invalid cooking twice weekly during the months of February, March, and April to the senior class of nurses.

The general health of the institution has been good on the whole. Two cases of typhoid fever developed among the employees of the hospital during the year, both traceable to outside sources. One, who was a hemophilic, died. Two cases of pellagra were admitted. One died and the other case cleared up. There has been considerable access of malaria in the institution recently owing to the filling in of the Anacostia River Flats. An effort has been made to guard against this as far as possible by local attention to the grounds and by screening of the windows and doors.

Continuous effort has been extended to improve the clinical records of the hospital, and they have been placed definitely in charge of one of the members of the staff, so that this effort may be consistently applied. Practically all of the cases that have been presented at staff conferences since April 1, 1908, and discharged have been catalogued, as well as the deaths which have been presented for diagnosis. The volume of work of the staff conferences became so great that since December, 1911, it was found impracticable to present deaths at the conference for diagnosis. Since then 113 deaths have been worked up and turned into the record room for cataloguing, and a considerably larger number are waiting to be transcribed by the stenographers. In May of this year a definite classification of mental disorders was tentatively adopted for cataloguing purposes.

Staff conferences.—During the year 604 cases have been presented at the staff conferences for consideration as to—

Discharge	361
Visit	67
Special opinions.....	115
Diagnosis	61
Total.....	604

On June 27 one patient and one employee were bitten by a cat, about whom the suspicion of rabies arose. The body of the cat was sent to the Bureau of Animal Industry for examination and report. The Bureau of Animal Industry reported that the animal had suffered from rabies, and arrangements were immediately made with the Hygienic Laboratory to give appropriate treatment to the two persons. As yet no symptoms have developed in either one.

Physical diseases treated during the year ending June 30, 1912.

	Male.				Female.				Total.
	White.		Colored.		White.		Colored.		
	Pa- tient.	Em- ployee.	Pa- tient.	Em- ployee.	Pa- tient.	Em- ployee.	Pa- tient.	Em- ployee.	
<i>General diseases.</i>									
<i>Infectious diseases:</i>									
Erysipelas	11				2	1	1		15
Gonorrhea						1			1
Influenza	58	32	6		1	5			102
Malaria	796	149	66		79	124	60		1,274
Parotitis	1	1	1			2			6
Septicæmia					1				1
Syphilis	20				1		5		35
Tonsillitis	22	22	5		30	44	15	2	150

Physical diseases treated during the year ending June 30, 1912—Continued.

	Male.				Female.				Total.
	White.		Colored.		White.		Colored.		
	Pa- tient.	Em- ployee.	Pa- tient.	Em- ployee.	Pa- tient.	Em- ployee.	Pa- tient.	Em- ployee.	
General diseases—Continued.									
Infectious diseases—Continued.									
Tuberculosis—									
Glandular.....			2				3	1	6
Intestinal.....			1		2				3
Articular.....			3						3
Peritoneal.....			2						2
Pulmonary.....	20		11		13	1	10		55
Typhoid fever.....						2			2
Urethritis, gonorrheal.....	1								1
Other general diseases:									
Adenitis.....		2	1						3
Alcoholism, chronic.....	3								3
Anemia.....	11		1		1	4	1		18
Anemia, pernicious.....	1								1
Arthritis deformans.....	1								1
Carcinoma of—									
Breast.....					1				1
Jaw.....			1						1
Larynx.....	1								1
Liver.....	1								1
Pancreas and duodenum.....			1						1
Stomach.....			1						1
Epithelioma.....	2		1		1				4
Fever, indeterminate.....	2								2
Fibroid, uterine.....							1		1
Fibroma.....	1								1
Lipoma.....						1	1		2
Tumor, nonmalignant.....							1		1
Pellagra.....					1				1
Rheumatism—									
Acute.....	9	13			4	3	2		31
Chronic.....	24				8	11	6		49
Diseases of the nervous system and organs of special sense.									
Aphasia.....					1		1		2
Blepharitis.....	1								1
Cataract:									
Senile.....					2		3		5
Traumatic.....					1				1
Cephalalgia.....							2		2
Cerebral concussion.....	1								1
Cerebral hemorrhage.....	7		3		3				13
Cerebral thrombosis.....			1						1
Chorea.....							1		1
Conjunctivitis.....	59		2		4		8		73
Encephalitis.....							1		1
Foreign body in eye.....	1	1							2
Hemiplegia.....	2		1		4		2		9
Hordeolum.....	5	1	1		3				10
Impacted cerumen.....	3								3
Iritis.....	3	1					2		6
Keratitis.....	1						2		3
Mastoiditis.....	1								1
Neuralgia.....	15	3			4	3	1		26
Neuritis.....		1			1	1	1		4
Neuritis, multiple.....							1		1
Ophthalmoplegia, externa.....							1		1
Otitis externa.....	3		1						4
Otitis media.....	3		1		4	3	2		13
Panophthalmitis.....	1								1
Poliencephalitis, inferior.....							1		1
Pterygium.....		1							1
Retinitis.....	1								1
Sclerosis, multiple.....					1				1
Status epilepticus.....	1								1
Torticollis.....						1			1
Ulcer, corneal.....	1								1
Diseases of the circulatory system.									
Cardiac valvular disease.....	17		1			2			20
Cardiovascular disease.....	1								1

Physical diseases treated during the year ending June 30, 1912—Continued.

	Male.				Female.				Total.
	White.		Colored.		White.		Colored.		
	Pa- tient.	Em- ployee.	Pa- tient.	Em- ployee.	Pa- tient.	Em- ployee.	Pa- tient.	Em- ployee.	
<i>Diseases of the circulatory system—Con.</i>									
Endocarditis.....	2				3				5
Endocarditis, chronic.....	2				16		17		35
Hemorrhage.....	3		1		2		3		9
Hemorrhoids.....	19	1	2		4		3		29
Myocarditis.....					1		1		2
Organic heart disease.....	14				1		1		16
Phlebitis.....					1				1
<i>Diseases of the respiratory system.</i>									
Asthma.....	9	1			1		1		12
Bronchitis.....	122	59	11		24	21	7		244
Coryza.....	16	2				1			19
Edema, pulmonary.....			1						1
Gangrene, pulmonary.....							1		1
Hydrothorax.....	2								2
Laryngitis.....	9	5	1		2		2		19
Pleuritis.....	6	2			3	4			15
Pneumonia:									
Broncho.....	3		3		1				7
Hypostatic.....	27		2		9		3		41
Lobar.....	5				6				11
Pulmonary congestion.....	4								4
Rhinitis.....	37	11	1		8	6	4		67
<i>Diseases of the digestive system.</i>									
Adenitis, submaxillary.....	1								1
Appendicitis.....	2	3	2			1	1		9
Cholangitis.....	2								2
Cholecystitis.....		1			2				3
Colic, intestinal.....	6								6
Colitis.....	117								117
Constipation.....	1								1
Diarrhea.....	37	2			3	1			43
Dysentery.....	3								3
Emesis.....					1				1
Enteritis.....	9	3	2		7		3		24
Enterocolitis.....	3				5	1			9
Fistula in ano.....	1		1						2
Gastritis.....	8	1	6		17	3	7		43
Gastroenteritis.....			6		27	6	2		35
Gingivitis.....					2				2
Hernia.....	1				1		1		3
Hernia, inguinal.....	1		2						3
Indigestion, acute.....	25	5			1	1			32
Obstipation.....	2					4	1		7
Peritonitis.....					1				1
Pharyngitis.....	12	6	2	1	4	1	5		31
Prolapsus recti.....					1				1
Pruritus ani.....	1								1
Stomatitis.....	5	3	1		1				10
<i>Diseases of the genito-urinary system.</i>									
Amenorrhoea.....						3			3
Balanitis.....	6								6
Chancroids.....			1						1
Cyst, vulvovaginal.....							1		1
Cystitis.....	35		1		2		2		40
Dysmenorrhoea.....					2	7	1		10
Epididymitis, acute.....		1					1		1
Hydrocele.....	1								1
Menorrhagia.....						2			2
Metrorrhagia.....						1		1	2
Nephritis:									
Acute.....	6		3		16	2	15		43
Chronic.....	19		4		30		12		65
Orchitis.....	1								1
Prolapsus uteri.....					1				1
Prolapsus, uteri.....					1				1
Prostatitis.....	2								2
Pyelitis.....					1				1
Pyelonephritis.....	2		1						3
Stricture, urethral.....	1								1

Physical diseases treated during the year ending June 30, 1912—Continued.

	Male.				Female.				Total.
	White.		Colored.		White.		Colored.		
	Pa-tient.	Em- ployee.	Pa-tient.	Em- ployee.	Pa-tient.	Em- ployee.	Pa-tient.	Em- ployee.	
<i>Diseases of the genito-urinary system—Continued.</i>									
Urethritis.....	1								1
Varicocele.....		1							1
Vulvovaginitis.....					1				1
<i>Diseases of the glandular system.</i>									
Adenitis, cervical, chronic.....	1								1
<i>Diseases of the skin and cellular tissue.</i>									
Abscess.....	88	8	12		4	2	4		118
Acne.....	2	1	1						4
Carbuncle.....	5								5
Cellulitis.....	4	1	1			1			7
Chilblain.....		1							1
Decubitus.....	5		7				1		18
Dermatitis.....	11	1	1		3		1		17
Eczema.....	26		5		1	6	1		39
Furunculosis.....	30	4	1		5	2	2		44
Gangrene.....	9				2		1		12
Herpes.....	5	1			1		1		8
Ingrowing nails.....	1						1		1
Intertrigo.....						1			1
Onychia.....	1								1
Paronychia.....	2					1			3
Pediculosis.....	4								4
Prickly heat.....	1	1							2
Psoriasis.....		1			2				3
Scabies.....	2				4				6
Seborrhoea.....	2								2
Tinea circinata.....	1		2						3
Tinea versicolor.....	1								1
Trychophytosis.....	1								1
Ulcer.....	18	1	4		1		1		25
Ulcer syphilitic.....							1		1
Urticaria.....	6	1	1						8
<i>Diseases of the organs of locomotion.</i>									
Bursitis.....					1				1
Myalgia.....	14	3	3		3	7	6		36
<i>Accidental traumatism.</i>									
Abrasions.....	15								15
Burns:									
First degree.....	1		1						2
Second degree.....								1	1
Third degree.....			1						1
Others.....	5	3			4		3		15
Contusions.....	14								14
Dislocations.....	2	1	1		3	1	2		10
Fracture:									
Clavicle.....	1				1				2
Femur.....	2				2				4
Humerus.....					1				1
Patella.....	2								2
Rib.....	1								1
Skull.....	1								1
Tibia.....	1								1
Others.....	11	1			1		1		17
Sprains.....	21	6			5	3	2		37
Wounds:									
Contused.....	63	7	3		7		3		83
Incised.....	101	5	12		10	2	8		138
Infected.....	6				11	6	4		27
Lacerated.....	76	6	15	1	4	2	1		105
Punctured.....	2								2
<i>Miscellaneous.</i>									
Fabricula, undertermined.....	3								3
Heat exhaustion.....	1								1
Total.....	2,281	397	233	2	457	309	272	5	3,966

Causes of death during the year ending June 30, 1912.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
<i>General and infectious diseases.</i>					
Carcinoma of—					
Face.....	1	1			2
Larynx.....	1				1
Stomach.....		1			1
Stomach and liver.....	1				1
Stomach and pancreas.....	1				1
Uterus.....				1	1
Diabetes mellitus.....	1				1
Sarcoma of jaw.....		1			1
Septicemia.....			1	2	3
Tuberculosis:					
Peritoneal.....	1				1
Pulmonary.....	25	9	2	8	44
Pulmonary and intestinal.....	4	2		1	7
Pulmonary and meningeal.....			1		1
Pulmonary and paresis.....	1	1			2
Of the spine.....			1		1
<i>Diseases of the nervous system.</i>					
Bulbar paralysis.....	1				1
Cerebral arteriosclerosis.....	1	1			2
Cerebral hemorrhage.....	5	3	2		10
Cerebral syphilis.....	1	1			2
Encephalitis.....				1	1
Epilepsy.....	1	2			3
Epilepsy and exhaustion.....	2				2
Intracranial hemorrhage.....		1			1
Meningitis, purulent.....	1				1
Organic brain disease.....	6	1	3	1	11
Paresis.....	23	16	1		40
Polioencephalitis, inferior.....				1	1
Senile dementia and exhaustion.....			1		1
Status epilepticus.....	1	2			3
Excitement and exhaustion.....	2				2
<i>Diseases of the circulatory system.</i>					
Arteriosclerosis.....		1			1
Cardiac atrophy.....	1				1
Cardiac valvular disease.....	28	4	3	4	39
Cardio renal disease.....	1		1		2
Cardiovascular renal disease.....			3	3	6
Endocarditis:					
Acute.....			1		1
Chronic.....	1				1
Myocarditis.....	3	1			4
Myocarditis, chronic.....	2				2
Rupture of heart.....	1				1
<i>Diseases of the respiratory system.</i>					
Bronchitis, chronic.....	3				3
Empyema.....	2				2
Pneumonia.....					
Broncho.....	5	1	2		8
Hypostatic.....	37	5	6	1	49
Lobar.....	7		4		11
Hypostatic, with pellagra.....				1	1
Pulmonary congestion.....	5				5
Pulmonary congestion and edema.....	2				2
Pulmonary edema.....	2				2
<i>Diseases of the digestive system.</i>					
Colitis.....	1				1
Colitis, chronic.....	2				2
Enteritis, acute.....	2	1			3
Enterocolitis.....	2		2		4
Gastritis, acute.....	1				1
Gastroenteritis.....			1		1
Peritonitis.....			1		1
Peritonitis following operation.....	1				1
Volvulus, intestinal.....	1				1

Causes of death during the year ending June 30, 1912—Continued.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
<i>Diseases of the genito-urinary system.</i>					
Cystitis:					
Chronic.....	2				2
Purulent.....		1			1
Cystitis and pyelitis.....			1		1
Cystitis and pyelonephritis.....	1				1
Nephritis:					
Diffuse.....	1				1
Acute.....			2	2	5
Chronic.....	2	2		4	8
<i>Diseases of the skin and cellular tissue.</i>					
Cellulitis.....	1				1
Gangrene of foot.....	2		1		3
<i>Miscellaneous.</i>					
Asphyxiation (suicidal).....		1			1
Cystic goiter.....			1		1
Total.....	199	59	43	31	332

Major operations were performed during the year.

	Male.				Female.				Total.
	White.		Colored.		White.		Colored.		
	Pa-tient.	Em- ployee.	Pa-tient.	Em- ployee.	Pa-tient.	Em- ployee.	Pa-tient.	Em- ployee.	
Amputation, index finger.....							1		1
Appendectomy.....	2					1	1		4
Benign tumor, excision.....	1						1		1
Cellulitis of leg, drainage.....	1								1
Cervical glands, excision.....		1	2		1		1		5
Cholecystostomy.....					1				1
Descending colon, resection.....	1				1				1
Eyeball, enucleation.....	1	1							2
Fracture of patella, wiring.....	1								1
Hemorrhoids, excision.....	1		1						2
Herniotomy.....	1								1
Ileocecal fistula, closure.....	1								1
Iridectomy.....	1								1
Ischiorectal abscess, drainage.....	1								1
Mastoidectomy.....	1								1
Prostatectomy.....	2								2
Sebaceous cyst, excision.....	1		1						2
Tubercular abscess, drainage.....	1								1
Tubercular testicle, excision.....			1						1
Total.....	17	2	5	.....	2	1	3	.....	30

Work of hydrotherapeutic department.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Patients treated.....	222		147	93	462
Treatments given.....	12,884		15,244	12,228	40,356

Dr. A. D. Weakley, in charge of the dental department, submits the following report of work done during the year:

Work of dental department during year ended June 30, 1912.

Teeth extracted.....	678
Fillings (various materials).....	603
Treatments.....	395
Mouths cleaned.....	159
Fractures reduced.....	1
Artificial plates.....	22
Artificial plates repaired.....	28
Crowns.....	12

Total number of patients treated.....	1, 279
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Dr. Arthur H. Kimball, in charge of the eye, ear, nose, and throat department, submits the following report of the work done during the year:

Work of eye, ear, nose, and throat department during year ended June 30, 1912.

Examinations and treatments, diseases of the eye:	
Refraction.....	253
Other diseases of the eye.....	314
Diseases of the nose and throat.....	70
Diseases of the ear.....	98
Operations.....	2
Total.....	737
Patients treated.....	718
Visits.....	62

SCIENTIFIC DEPARTMENT.

A considerable amount of work in this department has been in co-operation with the acting clinical director for purposes of so systematizing and rendering orderly the routine methods of procedure as to make them of maximum value with the minimum of effort and so leaving the greatest amount of time available for active research. The scientific work of the department, nevertheless, has been considerable, some 32 original articles having issued during the past year. These articles will be incorporated in the list of publications.

A very considerable number of autopsies has been performed during the year and as far as possible histological examinations have been made in each case with the result not only of reaching a histological diagnosis, but of finding rich material for original work. In the psychological department the subject of the investigation of occupations, particularly addressed to the therapeutic value, has been continued. The work of Miss Kent, which was done last year, was confined to the problem of habit formation in dementia præcox and was published in Volume XVIII of the Psychological Review. Work along similar lines is being carried further at the present time by Mr. Boring, a student in the graduate department of Cornell University.

During the past year we have also added a eugenics field worker to our force. Miss Ross, who has been doing this work, received her instruction for it at the Eugenics Field Office, Cold Springs Harbor, N. Y., which is maintained by the Carnegie Foundation, under

the directorship of Prof. Davenport. During the year she has studied some 25 families and is at present engaged in working out the pedigrees of some extremely interesting families in West Virginia, one family pedigree alone containing some 675 individuals with 54 defectives. In addition to this work she has from time to time investigated the local conditions surrounding families from which the hospital has received patients, especially when questions arise as to the influence of those conditions upon the mental disorder or upon the desirability of discharging the patient and returning him to his family. This work has been particularly valuable in connection with the recent practice of the juvenile court of this city, which has been sending from time to time juvenile offenders to the hospital for mental examination and report back to the court.

The third course for internes was given from October 9 to December 22. The course consisted of 30 formal lectures and 10 informal clinical exercises, dealing mainly with the examination of patients for different mental and physiological processes of interest and importance in the routine work of the hospital. Seven internes began this course, one resigned during its progress, the second did not complete the work, and the remaining five satisfied all the requirements. Most of the lectures followed the general plan outlined last year. Seven additional lectures were given, however, on the chemistry of the nervous system and of nervous and mental diseases. For four of these lectures we are indebted to Dr. C. L. Alsberg, of the Bureau of Plant Industry, of the Department of Agriculture, and the three remaining ones were given by Dr. Barnes, of the hospital staff.

Summary of clinical work of the laboratory.

Blood examinations (other than serological).....	48
Feces examinations.....	13
Pus examinations.....	3
Sputum examinations.....	167
Stomach contents examinations.....	3
Urine examinations.....	1, 222
Cerebrospinal fluid, cytological examinations.....	164
Wassermann reactions.....	951
Photographs taken.....	1, 036
Cerebral punctures.....	1
Autopsies.....	182
Histological examinations of tissues.....	122
Total.....	3, 912

Analysis of deaths due to tuberculosis for fiscal years ended June 30, 1885-1912.

Date.	Deaths.	Post-mortem examinations.	Cases not examined, post-mortem.	Deaths due to pulmonary tuberculosis.	Well - marked tubercular cases, post-mortem.	Cases of latent or limited pulmonary tuberculosis found in autopsies.	Total of pulmonary tubercular cases examined, post-mortem.	Cases of tuberculosis among those not examined by autopsy, based upon clinical diagnosis.	Total of all cases of death with pulmonary tuberculosis, clinical and post-mortem.	Percentage of tubercular cases among those that died, recognized clinically and at autopsy.	Percentage of those examined, post-mortem, which showed tubercular lesions.	Cases which died of other diseases than tuberculosis.
1885.....	105	60	36	13	18	3	21	2	23	21.9	30.4	93
1886.....	102	72	30	24	26	1	27	8	35	34.3	37.5	78
1887.....	92	49	43	13	9	1	10	9	19	20.6	20.4	79
1888.....	120	70	41	14	14	6	20	8	28	23.3	25.3	106
1889.....	114	67	47	23	19	3	22	10	32	28.0	32.8	91
1890.....	140	108	33	20	22	10	32	6	38	27.1	29.6	120
1891.....	128	79	49	21	13	5	18	13	31	24.2	22.7	107
1892.....	153	96	57	13	13	9	22	9	31	20.2	23.0	140
1893.....	181	117	64	22	34	9	43	8	51	28.1	26.7	159
1894.....	167	115	52	28	27	13	40	13	53	31.7	34.7	139
1895.....	179	125	54	18	20	6	26	11	37	20.6	20.8	161
1896.....	187	119	68	21	23	11	34	12	46	24.6	28.5	166
1897.....	162	90	72	13	15	4	19	9	28	17.2	21.1	149
1898.....	197	85	112	19	17	3	20	14	34	17.6	23.5	178
1899.....	193	81	112	31	22	3	25	20	45	23.3	30.8	162
1900.....	184	94	90	25	17	6	23	10	33	17.9	24.4	189
1901.....	226	109	117	31	27	14	41	16	57	25.0	37.8	195
1902.....	177	92	85	19	20	7	27	7	34	29.3	29.0	158
1903.....	258	125	133	36	25	18	43	15	58	22.5	34.4	222
1904.....	243	103	140	28	15	5	20	13	33	13.6	19.4	215
1905.....	236	114	122	28	18	6	24	12	36	15.2	21.0	208
1906.....	202	114	88	29	18	11	29	11	40	19.8	25.4	173
1907.....	216	128	88	33	16	15	31	17	48	22.2	24.2	184
1908.....	201	128	73	14	12	15	27	4	31	15.4	21.0	187
1909.....	255	164	91	38	30	29	59	9	68	26.6	35.9	217
1910.....	260	161	99	25	21	28	49	16	65	25.0	30.5	235
1911.....	280	165	115	41	28	29	57	8	65	23.2	31.7	239
1912.....	332	182	152	44	21	59	80	27	107	32.2	43.9	288
Total...	5,290	3,030	2,262	684	560	329	889	317	1,206	23.2	28.4	4,606

PUBLICATIONS.

The following publications by members of the hospital staff have appeared during the year:

By William A. White, M. D., superintendent:

The Borderland Between Internal Medicine and Psychiatry. The Washington Medical Annals. Vol. X, No. 4, September, 1911. 191-197.

Dementia Precox. Archives of Diagnosis, vol. 4, October, 1911.

The Theory of Schizophrenic Negativism. (Translation from the German, of Prof. E. Bleuler.) Journal of Nervous and Mental Disease Monograph Series, 1912.

Fundamentals of the Freudian Psychology. New York Medical Journal, May 11, 1912, vol. 95, 969-970.

The Study of Mind in Medical Education. Journal of the American Medical Association, May 11, 1912, Vol. LVIII, pp. 1417-1421.

The Medieval Mind. A History of the Development of Thought and Emotion in the Middle Ages. (A book review of Henry Osborn Taylor's work.) Journal of Nervous and Mental Disease, vol. 39, No. 6, June, 1912.

Dreams and Myths. A Study in Race Psychology. (Translation from the German, of Dr. Karl Abraham.) Beginning May, 1912, number of Journal of Nervous and Mental Disease.

Biographical Sketch of I. W. Blackburn. Amer. Jour. Insanity (vol. 68, 331-333), 1911.

- By Shepherd I. Franz, A. B., Ph. D., scientific director:
 Psychopathological Part of the Psychopathological Index, 1911, No. 17.
 On the Association Functions of the Cerebrum. Bulletin No. 3, Government Hospital for Insane, 1911, 5-14. (Reprint.)
 (With W. C. Ruediger.) Sensory Changes in the Skin Following the Application of Local Anesthetics and Other Agents: Ethyl Chloride. Bulletin No. 3, Government Hospital for Insane, 1911, 15-26. (Reprint.)
 On the Functions of the Post-Central Cerebral Convolutions. Bulletin No. 3, Government Hospital for Insane, 1911, 27-36. (Reprint.)
 On the Functions of the Cerebrum: Concerning the Lateral Portions of the Occipital Lobes. Amer. Jour. Physiol., 1911, vol. 28, 308-317.
 On the Functions of the Cerebrum: The Occipital Lobes. 1911. 118 p.
 Handbook of Mental Examination Methods. Journal of Nervous Diseases, Monograph Series. 1912. 165 p.
 New Phrenology. Science, N. S., 1912, vol. 35, 321-328.
 The Present Status of Psychology in Medical Education and Practice. Jour. Amer. Med. Assn., 1912, vol. 58, 909-911.
 Experimental Psychopathology. Psychol. Bull., 1912, vol. 9, 145-154.
 Psychopathological Part of the Psychopathological Index. 1912, No. 18.
 Articles on Psychopathology (Circular Insanity—Fixed Ideas) in Encyclopedia of Education. 1912. Vol. 2.
- By the late I. W. Blackburn, pathologist:
 Pachymeningitis Interna. Bulletin No. 3, Government Hospital for Insane, 1911, 37-44. (Reprint.)
 Atrophy of the Brain in the Insane. Bulletin No. 3, Government Hospital for Insane, 1911, 45-50.
 On the Median Anterior Cerebral Artery as Found Among the Insane. Bulletin No. 3, Government Hospital for Insane, 1911, 51-56. (Reprint.)
 Spindle-Cellled Endothelial Sarcoma of the Dura Mater. Bulletin No. 3, Government Hospital for Insane, 1911, 57-59.
 Pachymeningitis Interna. Jour. Nerv. and Ment. Dis., 1911, vol. 38, 467-476.
- By W. H. Hough, clinical pathologist:
 (With G. R. Lafora.) Some Findings in the Cerebrospinal Fluid of Acute Anterior Poliomyelitis, Epidemic Form. Bulletin No. 3, Government Hospital for Insane, 1911, 60-72. (Reprint.)
 (With R. Müller.) Comparative Globulin Estimation of Luetic Sera. Bulletin No. 3, Government Hospital for Insane, 1911, 73-76. (Reprint.)
 Diagnostic Value of Cerebrospinal Fluid. Maryland Psychiatric Quart., 1911, vol. 1, 26-29.
- By Bernard Glueck, senior assistant physician:
 Paresis in General Practice. Charlotte Med. Jour., 1911, vol. 64, 1-6.
 A Contribution to the Study of Psychogenesis in the Psychoses. Amer. Jour. Insan., 1912, vol. 68, 371-429.
 (With Gonzalo R. Lafora.) Contribution to the Histopathology and Pathogenesis of Myoclonic-Epilepsy. Bulletin No. 3, Government Hospital for Insane, 1911, 95-111.
 (With Gonzalo R. Lafora.) Beitrag zur Histopathologie der Myoklonischen Epilepsie. Zeitschr. f. d. ges. Neur. u. Psychiatr., 1911, vol. 6, 1-15.
- By Francis M. Barnes, Jr., senior assistant physician:
 Pupillary Disturbances in the Alcoholic Psychoses. Bulletin No. 3, Government Hospital for Insane, 1911, 112-119.
 Chemistry of Nervous and Mental Diseases. Amer. Jour. Insan., 1912, vol. 68, 481-472.
 Mental Disorders Associated with Syphilis. Amer. Jour. Insan., 1912, vol. 68, 633-659.
 (With W. L. Moss.) Concerning the Much-Holzmann Reaction. Johns Hopkins Bulletin, 1911, vol. 22, 277-282.
- By Nicholas J. Dynan, assistant physician:
 A Case of Dural Endothelioma Involving the Frontal Lobes. N. Y. Med. Jour., 1911, vol. 94, 928-929.
- By Eva C. Reid, assistant physician:
 Manifestations of Manic-depressive Insanity in Literary Genius. Amer. Jour. Insan., 1912, vol. 68, 595-632.
- By Meyer Solomon, junior assistant physician:
 Report of a Pronounced Case of Splenomyelogenous Leukemia, with Autopsy. Med. Record, 1911, vol. 79, 1093-1095.

By Gonzalo R. Lafora, histopathologist:

On Neuroglia Karyorrhexis. Bulletin No. 3, Government Hospital for Insane, 1911, 77-82. (Reprint.)

On the Presence of Amyloid Bodies in the Protoplasm of the Ganglion Cells; a Contribution to the Study of the Amyloid Substance in the Nervous System. Bulletin No. 3, Government Hospital for Insane, 1911, 83-92. (Reprint.)

Notes on Some Phenomena of Reaction and Regeneration of the Nervous System. Bulletin No. 3, Government Hospital for Insane, 1911, 93-95.

(With Bernard Glueck.) Beitrag zur Histopathologie der myoklonischen Epilepsie. Ztsch. f. d. ges. Neur. u. Psychiat., 1911, vol. 6, 1-15.

Beitrag zur Kenntniss der Alzheimerschen Krankheit oder präsenilen Demenz mit Herdsymptomen. Ztsch. f. d. ges. Neur. u. Psychiat., 1911, vol. 6, 15-21.

Ueber das Vorkommen amyloider Körperchen in Innern der Ganglionzellen; zugleich ein Beitrag zum Studium der amyloiden Substanz in Nervensystem. Virchow's Archiv., 1911, vol. 205, 296-303.

Obscure Symptomatology with Tumors of the Fourth Ventricle, with Report of a Case of Ependymoglioma of the Fourth Ventricle Associated with Angioma of the Pons. N. Y. Med. Jour., 1911, vol. 94, 1027-1030.

(With Bernard Glueck.) Contribution to the Histopathology and Pathogenesis of Myoclonic Epilepsy. Bulletin No. 3, Government Hospital for Insane, 1911, 96-111.

Contribucion al estudio de la demencia senil y sus formas. Riv. clin. de Madrid, 1911, vol. 3, 41-50.

El substratum anatomo-pathologico de la polioencefalitis hemorragica superior de Wernicke. Riv. clin. de Madrid, 1912, vol. 4, 121-139.

Zur Frage der hereditären Paralyse des Erwachsenen (Dementia paralytica hereditaria tarda). Ztsch. f. d. ges. Neur. u. Psychiat., 1912, vol. 9, 443-462.

By Heber Butts, United States Navy, passed assistant surgeon:

A Psychopathic Malingerer. Military Surgeon, 1911, vol. 28, 623-638.

Further Observation of the Insane in the Navy. U. S. Med. Naval Bull., 1912, vol. 6, 198-212.

By L. L. Smith, United States Army, captain, Medical Corps:

(Translation) Stier: Progress in the Methods for the Care of the Insane in Time of War. The Military Surgeon, 1912, vol. 30, 332-335.

By Grace H. Kent, Ph. D., assistant in psychology:

Experiments on Habit Formation in Dementia Precox. Psychological Review, 1911, vol. 18, 375-410.

STAFF CHANGES.

The following resignations took effect during the year: Oliver C. Cox, medical interne; Rose Alexander, junior assistant physician; Hyman Laveson, junior assistant physician; M. Edith Conser, junior assistant physician; Halbert Robinson, medical interne; Meyer Solomon, junior assistant physician; Helen A. Binnie, medical interne; Grace H. Kent, assistant in psychology.

The following new appointments and assignments were made during the year: Oliver C. Cox, medical interne; Grace De Witt, medical internal; Samuel W. McEwan, medical interne; John A. Pfeiffer, medical interne; Helen A. Binnie, medical interne. Dr. Sheldon G. Evans, surgeon, United States Navy, was assigned to duty in this hospital March 18, 1912, in place of Dr. Heber Butts, who was assigned to duty in the Philippines. Dr. Edgar King, captain, Medical Corps, United States Army, was assigned to duty in this hospital June 26, 1912, vice Dr. L. L. Smith, who was assigned to duty in the Walter Reed Hospital, Washington, D. C. The purpose of these assignments by the Army and Navy is to make a special study of the subject of military psychiatry as it affects these two services.

SCIENTIFIC MEETINGS.

On December 30, 1911, a special session of the eugenics section of the American Breeders' Association was held at the hospital. Dr. William A. White, superintendent of the hospital, discussed the methods and results of the field work and spoke of the difficulties of diagnosis. Dr. Frederick A. Rhodes, of Pittsburgh, gave a paper entitled "Eugenics from the standpoint of the physician." Dr. Henry A. Cotton showed charts illustrating inheritance of insanity and a paper by Dr. F. A. Woods, entitled "Alternative human inheritance in eugenics," was read.

On December 28, 1911, a joint session of the American Psychological Association and the Southern Society for Philosophy and Psychology was held at the hospital. The five following papers were read in a symposium on "The relations of psychology and medical education":

The present status of psychology in medical education and practice. By Shepherd Ivory Franz, Ph. D., scientific director and psychologist of this hospital.

The value of psychology in Psychiatry. By Adolph Meyer, M. D., professor of psychiatry, director of Phipps Psychiatric Institute, Johns Hopkins University.

Psychopathology and neuropathy: The problems of teaching and research contrasted. By E. E. Southard, M. D., professor of neuropathology, Harvard Medical School; director of Psychiatric Institute, Boston, Mass.

Content of a course in psychology for medical students. By John B. Watson, Ph. D., professor of psychology and director of Psychological Laboratory, Johns Hopkins University.

The new psychology and therapeutics. By Morton Prince, M. D., professor of neurology, Tufts Medical School; editor of Journal of Abnormal Psychology.

BULLETIN No. 4.

At the close of the year Bulletin No. 4 is going to press. It contains the following articles:

Dr. Franz:

"On some functions of the cerebral occipital lobes."

Dr. Blackburn (collated and edited by Dr. Franz):

"A note on plasma cells and mast cells."

Dr. Barnes:

"Errors in the clinical diagnosis of mental disorders associated with cerebral syphilis."

Dr. Glueck:

"A contribution to the catamnestic study of the juvenile offender."

Dr. Lafora:

"Histopathological report of a case of poliomyelitis anterior epidemica."

"Obscure symptomatology with tumors of the fourth ventricle; with report of a case of ependymoglioma of the fourth ventricle associated with angioma of the pons."

"On special connective-tissue plaques of the internal surface of the dura-mater found in connection with hemorrhagic pachymeningitis."

"On the changes of the nervous system in pernicious malaria and the neurological sequelae resulting from malarial toxemia."

NEEDS OF THE HOSPITAL.

During the year a committee of six, consisting of Surg. Gen. George H. Torney, United States Army, representing the Secretary of War; Surg. A. W. Dunbar, representing the Secretary of the Navy; Mr. Robert V. La Dow, Superintendent of Prisons, representing

the Attorney General; Maj. William V. Judson, Corps of Engineers, United States Army, representing the Commissioners of the District of Columbia; Mr. Scott C. Bone, representing the Board of Visitors of the Government Hospital for the Insane; and Dr. William A. White, superintendent of the Government Hospital for the Insane, representing the Secretary of the Interior, appointed by the Secretary of the Interior, after consultation with the President, went into a full investigation of the needs of the hospital and the future policy for its growth and development. The result of their deliberations was printed in the form of a report, transmitted to the Secretary of the Interior, and later transmitted to Congress by the President (S. Doc. 256, 62d Cong., 2d sess.). This report discusses very fully questions of the needs of the hospital under four heads:

First. Defects in the laws governing the conduct of the institution and the commitment of patients. Under this head a draft of proposed legislation is included for commitment from the District of Columbia, along with certain changes in the legislation with reference to the transfer of Federal prisoners to the hospital.

Second. The advisability of continuing in the hospital patients committed from the District of Columbia and from the Army and Navy from distant points. Under this head is discussed the whole question of the policy of the future of the hospital with reference to the commitment of patients from distant points.

Third. The policy to be adopted relating to the growth of the institution and the matter of additional lands, buildings, equipment, etc. Here the questions of administration, size of the institution, and its physical needs are discussed, together with a special report as to the care of the criminal insane.

Fourth. The present conduct of the institution, including recommendations for improvement of the service and the advancement of the interests of the inmates. Under the third section the needs of the hospital are set forth as follows:

Barns and piggeries.—The present buildings, comprising the barns and piggeries, are located on the east side of Nichols Avenue and immediately fronting on it. All of these buildings are very old, and many of them in extremely dilapidated condition. The buildings are not only old and dilapidated, but it is impossible because of those conditions to keep them in proper sanitary condition, while one of the barns is positively unsafe. A dairy barn should be constructed consisting of four units, each to accommodate 50 cows, and piggeries are required to accommodate 600 pigs. Milk is one of the most important and staple articles of diet in the hospital, and should be produced in such a way as to insure its freedom from even the suspicion of disease. It can not be bought in the neighborhood of the hospital in the quantity needed or the quality that the hospital should have. The piggeries for 600 pigs are considered to be an essential economy. As it is at the present time the hospital has to sell a considerable portion of its swill, and it should have a sufficient number of pigs to consume all of the swill. This would be a decided economy to the institution. Estimated cost \$50,000.

Additional land.—If the institution is materially to increase over its present size, the acquirement of additional land is imperative. This can be easily appreciated when attention is called to the fact that the hospital has not now enough land for its purposes. It would seem to go without saying, also, that if additional land is to be acquired it should be purchased at the earliest possible date. The neighborhood of the hospital is becoming more and more thickly settled as the years go by, and the price of land is progressively increasing. Every year that an opportunity to secure additional land is put off means that more money will have to be paid for that land.

The appropriation for additional land should be made available for the use of the Secretary of the Interior in making the necessary purchase. In the event

of his inability to make such purchase, it should be provided that he shall proceed in the manner prescribed for providing a site for the Government Printing Office, in so much of the act of July 1, 1898, as is set forth on pages 648 and 649 of volume 30 of the Statutes at Large, to acquire the land desired; and for the purpose of such acquisition the Secretary of the Interior should have and exercise all the power conferred upon the Public Printer in such act; the appropriation to be disbursed by the Secretary of the Interior. Estimated cost, \$50,000.

Staff quarters.—If the institution is to continue increasing in size it is going to be necessary to provide in some way for the increasing number of officers who will have to be employed. At the present time a considerable number of the medical staff and their families live on the second floor of the administration building. This is a poor arrangement both from the standpoint of the comfort of the medical officers and their families, and of conducting the business affairs of the institution, and inasmuch as the growth of the institution is progressing so rapidly it is quite easy to see a point in the not distant future when additional office room will be needed, and it would seem that the logical thing to do would be to construct staff quarters and to occupy the present staff quarters with officers. Estimated cost, \$25,000.

Epileptic colony.—The hospital has been increasing rapidly in size lately, and the 1,000 beds for which the hospital extension was constructed are already filled. In certain portions of the hospital there is evidence of crowding. It is therefore the part of wisdom to provide for further growth, and in making this provision it is deemed desirable to build such extensions as will enable a better classification of the hospital population. While the epileptics are at present fairly well segregated, they are in wards that were built for a different class of patients. The buildings of an epileptic group can be so constructed as to admit of indefinite extension, and will give this class of patients a character of surroundings much better suited to them than they now have, and the wards they now occupy can be used for the general purpose of the hospital population. The estimated cost for 140 patients on a basis of \$1,000 per capita is considered under all conditions to be reasonable, while \$100 per capita has been allowed for equipment. The additional \$6,000 is intended to include the cost of the plans, the architect's fees, advertising, etc. Estimated cost, \$160,000.

Farm colony.—The acquirement of additional land in the way of both farm lands and for buildings for patients, for the construction of a farm colony where the chronic, custodial, and physically well patients could be sent to do the work, is most desirable. Estimated cost, \$25,000.

Shop and storehouse building.—The project for building a shop building is in the scheme of changes about Howard Hall, special report upon which has been made and is in printed form. Estimated cost, \$24,755.

Provision for criminal insane.—Details included in report above mentioned. Estimated cost, \$30,454.

Gatehouse.—There should be a gatehouse at the new main entrance to the hospital. Estimated cost, \$8,000.

Fence.—An appropriate fence or wall should surround the hospital grounds, and this is especially important because of the increased number of residences which are being built in close proximity to the reservation. Estimated cost, \$14,000.

Name of hospital.—The name of the hospital should be changed so as to eliminate the word "insane," which, perforce, is printed on all official stationery and becomes, for sentimental reasons, an extremely disagreeable reminder to those with whom the hospital is in constant correspondence. This recommendation is in line with changes which have been made in various States changing the names of their institutions from "asylums" to "hospitals," from "insane asylums" to "State hospitals."

Building for women patients.—The female portion of the hospital is not only filled, but in some places beginning to be crowded. A new building for women will be needed in the very near future. It is highly desirable for the extension of the female portion of the hospital that the land immediately adjoining the reservation at the south and on the west side of Nichols Avenue be acquired. This is practically the only direction in which the extension of the female part of the institution can take place. Estimated cost, \$100,000.

Fire-alarm apparatus.—Finally, your committee believes that the hospital should be provided with some form of fire-alarm apparatus. It understands that the final disposition of certain questions arising out of a contract to install a certain fire-alarm device is at present under consideration in your depart-

ment, and would suggest that in the event of being unable for any reason whatever to place the present installation in working order so that it will offer protection to the institution that steps be taken to secure some other apparatus, and would suggest that the system of automatic alarm by means of columns of air in metal tubes, now installed in certain buildings under the control of the War Department, be given careful consideration in this connection.

There will be of course required the usual appropriations for maintenance, repairs, roadways, walks, and grades, estimates of which are included in the following summary.

For general repairs and improvements, roadways, walks, and grading, and the support, clothing, and treatment in the Government Hospital for the Insane of the insane of the Army and Navy, Marine Corps, Revenue-Cutter Service, inmates of the National Homes for Disabled Volunteer Soldiers, persons charged with or convicted of crime against the United States who are insane, all persons who have become insane since their entry into the military service of the United States who have been admitted to the hospital and who are indigent, including purchase, maintenance, and driving of necessary horses and vehicles, and of horses and vehicles for official use of the superintendent, for the indigent insane admitted from the District of Columbia, and nonresident insane persons under temporary care, the sum of \$724,800 will be needed. This amount is based on 3,020 patients at \$240 per capita. This number is arrived at by estimating the probable increase on the basis of what the increase has been in past years. Pursuing the same method of calculation for the District of Columbia patients, their share is \$362,400, leaving \$362,400 to be provided for in the sundry civil bill. Out of this amount it is proposed to allot \$55,000 for general repairs and improvements, and \$5,000 for roadways, walks, and grading.

As the sundry civil appropriation act for the fiscal year ending June, 1913, provides that hereafter the expenditures for repair of buildings, roadways, and walks shall be included in the per capita cost of maintenance and treatment, it is recommended the appropriation in the sundry civil bill for 1914 be made to read as follows:

For general repairs and improvements, roadways, walks, and grading, support, clothing, and treatment in the Government Hospital for the Insane of the insane from the Army and Navy, Marine Corps, Revenue-Cutter Service, inmates of the National Home for Disabled Volunteer Soldiers, persons charged with or convicted of crimes against the United States who are insane, all persons who have become insane since their entry into the military and naval service of the United States who have been admitted to the hospital and who are indigent, including purchase, maintenance, and driving of necessary horses and vehicles and of horses and vehicles for official use of the superintendent, three hundred and sixty-two thousand four hundred dollars; and not exceeding one thousand five hundred dollars of this sum may be expended in defraying the expense of the removal of patients to their friends; not exceeding one thousand dollars may be expended in the purchase of such books, periodicals, and papers as may be required for the purposes of the hospital and for the medical library, and not exceeding one thousand five hundred dollars for actual and necessary expenses incurred in the apprehension and return to the hospital of escaped patients.

For two underwriter force pumps to be used for fire protection, with necessary pump house and foundation, together with required piping for making connections. Estimated cost, eleven thousand five hundred dollars.

Summary of appropriations recommended.

Support, roadways, walks, and grading, repairs and improvements.....	\$362,400
Barns and piggeries.....	50,000
Additional land.....	50,000
Staff quarters.....	25,000
Epileptic colony.....	160,000
Farm colony.....	25,000
Shop and storehouse building.....	24,755
Provision for criminal insane.....	30,454
Gate house.....	8,000
Fence.....	14,000
Building for women patients.....	100,000
Force pumps.....	11,500
Total.....	861,109

STATISTICAL TABLES.*Admissions and discharges.*

	Male.			Female.			Total.
	White.	Colored.	Total.	White.	Colored.	Total.	
Remaining June 30, 1911:							
Army.....	825	44	869				869
Navy.....	251	17	268				268
Public Health and Marine-Hospital Service.....	38	7	45				45
Civil life.....	619	315	934	478	268	746	1,680
Total.....	1,733	383	2,116	478	268	746	2,862
Admitted during the year:							
Army.....	166	12	178				178
Navy.....	101	7	108				108
Public Health and Marine-Hospital Service.....	7		7				7
Civil life.....	181	69	250	110	80	190	440
Total.....	455	88	543	110	80	190	733
Discharged during the year:							
Recovered—							
Army.....	33		33				33
Navy.....	31	2	33				33
Public Health and Marine-Hospital Service.....	2		2				2
Civil life.....	26	12	38	21	19	40	78
Total.....	92	14	106	21	19	40	146
Improved—							
Army.....	7	1	8				8
Navy.....	9		9				9
Public Health and Marine-Hospital Service.....	1		1				1
Civil life.....	8	7	15	10	9	19	34
Total.....	25	8	33	10	9	19	52
Unimproved—							
Army.....	8		8				8
Navy.....	3	1	4				4
Public Health and Marine-Hospital Service.....							
Civil life.....	54	6	60	22	8	30	90
Total.....	65	7	72	22	8	30	102
Not insane—							
Army.....	6	1	7				7
Navy.....	24	1	25				25
Public Health and Marine-Hospital Service.....							
Civil life.....	16	7	22	6	5	11	33
Total.....	45	9	54	6	5	11	65

Admissions and discharges—Continued.

	Male.			Female.			Total
	White.	Colored.	Total.	White.	Colored.	Total.	
Deceased during the year:							
Army.....	111	10	121				121
Navy.....	22	2	24				24
Public Health and Marine-Hospital Service.....	5		5				5
Civil life.....	61	47	108	43	31	74	182
Total.....	199	59	258	43	31	74	332
Remaining June 30, 1912:							
Army.....	826	44	870				870
Navy.....	253	18	271				271
Public Health and Marine-Hospital Service.....	37	7	44				44
Civil life.....	646	305	951	486	276	762	1,713
Total.....	1,762	374	2,136	486	276	762	2,898
SUMMARY.							
Remaining June 30, 1911.....	1,733	383	2,116	478	268	746	2,862
Admitted during year ended June 30, 1912.....	455	88	543	110	80	190	733
Total number under treatment.....	2,188	471	2,659	588	348	936	3,595
Discharged:							
Recovered.....	92	14	106	21	19	40	146
Improved.....	25	8	33	10	9	19	52
Unimproved.....	66	7	72	22	8	30	102
Not insane.....	45	9	54	6	5	11	65
Died.....	199	59	258	43	31	74	332
Total.....	426	97	523	102	72	174	697
Remaining June 30, 1912.....	1,762	374	2,136	486	376	762	2,898

Admissions and discharges, classified according to sex, for the year ended June 30, 1912, and since opening of the hospital in 1855.

	Year ended June 30, 1912.			Since opening of the hospital		
	Male.	Female.	Total.	Male.	Female.	Total.
Admitted.....	543	190	733	15,487	4,507	19,994
Discharged:						
Recovered.....	160	51	211	5,202	1,181	6,383
Improved.....	33	19	52	2,269	850	3,119
Unimproved.....	72	30	102	639	258	897
Died.....	258	74	332	5,241	1,456	6,697
Remaining.....	2,136	762	2,898			
Total admissions.....				15,487	4,507	19,994

Percentage of total admissions, recovered, improved, etc.

	Male.	Female.	Total.
Recovered.....	33.59	26.21	31.91
Improved.....	14.65	18.87	15.60
Unimproved.....	4.13	5.72	4.48
Died.....	33.84	32.30	33.49
Remaining.....	13.79	16.90	14.52
Total.....	100.00	100.00	100.00

Monthly changes of population.

	Admitted.			Discharged.			Died.			Total died and dis- charged.
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	
1911.										
July.....	54	15	69	20	8	28	34	13	47	76
August.....	50	18	68	25	9	34	19	2	21	55
September.....	32	15	47	20	13	33	21	3	24	57
October.....	60	9	69	22	8	30	25	10	35	65
November.....	38	3	41	27	6	33	20	3	23	56
December.....	44	17	61	19	5	24	20	5	25	49
1912.										
January.....	39	18	57	22	6	28	22	7	29	57
February.....	43	20	63	19	8	27	23	4	27	54
March.....	60	17	77	32	7	39	21	8	29	68
April.....	41	26	67	19	6	25	16	7	23	49
May.....	46	15	61	20	11	31	16	7	23	54
June.....	36	17	53	20	13	33	21	5	26	50
Total.....	543	190	733	265	100	365	258	74	332	697

Admissions, discharges, and deaths, with the mean annual mortality and proportion of recoveries, per cent of the discharges, including deaths, for each year since the opening of the hospital.

Year.	Admitted.			Discharged.						Died.		Remain- ing June 30 in each year.		Daily average.				Percentage of recoveries on dis- charges.				Percentage of deaths on aver- age numbers.				Percentage of deaths on total number.				
				Recovered.		Improved.		Unimproved.																						
	M.	F.	To- tal.	M.	F.	To- tal.	M.	F.	To- tal.	M.	F.	To- tal.	M.	F.	To- tal.	M.	F.	To- tal.	M.	F.	To- tal.	M.	F.	To- tal.	M.	F.	To- tal.			
1855-56.....	26	37	63	3	3	.....	.....	.....	.....	.....	26	34	60	19.35	20.65	40.00	100.00	100.00	.....	12.13	7.09	10.10	8.06	6.66	7.48	.....	.....	.....		
1856-57.....	36	11	47	3	2	5	.....	.....	.....	.....	54	39	93	41.20	37.98	79.18	33.50	35.71	12.13	8.06	6.66	7.48	.....	.....	.....	.....	.....	.....		
1857-58.....	25	27	52	4	6	1	.....	.....	.....	.....	59	50	109	54.55	42.80	97.35	10.25	16.66	14.06	18.69	16.43	10.13	12.12	11.03	.....	.....	.....			
1858-59.....	29	14	43	5	18	1	.....	.....	.....	.....	65	52	117	57.70	50.31	108.01	56.52	44.66	51.12	13.91	11.92	10.43	7.95	9.37	8.55	.....	.....	.....		
1859-60.....	47	18	65	5	21	1	.....	.....	.....	.....	84	54	138	72.93	56.24	129.17	57.52	41.27	47.73	8.22	7.11	7.74	5.36	5.71	5.49	.....	.....	.....		
1860-61.....	68	24	92	7	33	4	.....	.....	.....	.....	106	61	167	100.68	59.00	159.68	56.52	41.17	52.38	12.91	8.47	11.25	8.55	6.41	7.25	.....	.....	.....		
1861-62.....	64	31	95	42	11	53	2	.....	.....	.....	109	72	181	109.72	64.81	174.57	68.85	55.55	41.17	52.38	12.91	8.47	11.25	7.61	7.82	.....	.....	.....		
1862-63.....	174	12	186	96	8	104	14	1	.....	.....	147	65	212	123.75	65.74	189.49	70.59	42.00	67.09	10.15	11.90	9.81	7.08	7.61	7.82	.....	.....	.....		
1863-64.....	330	25	355	197	6	203	17	1	.....	.....	203	76	279	168.41	72.31	240.72	71.89	42.85	70.45	35.34	11.95	14.44	10.76	.....	.....	.....	.....	.....		
1864-65.....	454	25	509	282	6	288	69	1	.....	.....	364	86	450	205.73	77.66	283.39	66.66	40.00	65.75	10.30	11.75	9.51	7.92	9.51	.....	.....	.....	.....	.....	
1865-66.....	478	36	514	315	9	324	110	12	.....	.....	387	93	480	277.42	90.70	368.12	52.32	20.00	53.64	10.50	11.75	9.51	6.35	17.01	.....	.....	.....	.....	.....	
1866-67.....	184	28	222	104	5	109	20	7	.....	.....	167	83	250	190.92	90.70	281.62	59.42	20.00	53.64	10.50	11.75	9.51	11.53	9.51	10.90	.....	.....	.....	.....	.....
1867-68.....	120	33	153	49	15	64	6	2	.....	.....	153	102	255	217.61	59.75	377.36	59.75	65.22	60.95	9.95	5.18	9.35	7.14	11.96	8.40	.....	.....	.....	.....	.....
1868-69.....	133	35	168	59	11	70	9	6	.....	.....	168	109	277	244.55	108.03	352.58	59.00	39.28	54.69	9.81	8.33	9.35	6.70	5.07	5.77	.....	.....	.....	.....	.....
1869-70.....	146	36	182	32	8	40	16	8	.....	.....	182	123	305	294.69	108.08	402.77	43.24	36.37	41.67	5.09	2.77	4.36	7.21	6.05	6.78	.....	.....	.....	.....	.....
1870-71.....	161	34	195	50	12	62	21	7	.....	.....	195	134	329	354.34	121.66	476.00	46.30	36.36	43.97	9.31	9.04	9.24	7.50	6.41	6.78	.....	.....	.....	.....	.....
1871-72.....	153	51	204	49	15	64	23	5	.....	.....	204	156	360	431.03	144.11	575.14	45.00	39.47	44.12	7.42	9.02	7.82	6.70	4.11	5.88	.....	.....	.....	.....	.....
1872-73.....	192	38	230	69	12	79	22	8	.....	.....	230	166	396	492.44	151.36	643.80	50.00	35.29	47.03	7.92	7.27	7.76	7.01	5.79	5.88	.....	.....	.....	.....	.....
1873-74.....	179	51	230	66	9	75	28	10	.....	.....	230	166	396	536.46	164.17	700.37	42.13	21.95	38.66	9.50	4.26	8.76	7.21	3.38	3.68	.....	.....	.....	.....	.....
1874-75.....	166	47	213	67	17	84	26	10	.....	.....	213	168	381	564.78	165.59	730.37	47.18	37.78	45.45	8.49	10.87	9.04	7.63	3.45	3.76	.....	.....	.....	.....	.....
1875-76.....	157	77	234	66	17	83	27	13	.....	.....	234	174	408	587.41	176.30	763.71	47.80	45.94	46.86	7.66	3.96	5.52	6.92	13.19	5.52	.....	.....	.....	.....	.....
1876-77.....	138	44	182	69	11	80	32	9	.....	.....	182	173	355	596.82	184.37	781.19	49.40	33.33	38.96	6.19	4.88	5.88	6.93	4.87	6.20	.....	.....	.....	.....	.....
1877-78.....	169	53	222	68	14	82	30	7	.....	.....	222	183	405	619.10	196.70	815.80	44.73	54.64	46.93	8.23	6.01	7.92	6.93	4.87	6.20	.....	.....	.....	.....	.....
1878-79.....	181	44	225	68	10	72	27	10	.....	.....	225	187	412	655.34	196.63	851.97	35.51	35.00	35.37	9.19	8.51	9.03	7.76	5.28	5.45	.....	.....	.....	.....	.....
1879-80.....	161	62	223	62	10	72	27	10	.....	.....	223	187	410	586.75	171.11	757.86	45.78	23.25	36.92	9.19	8.51	9.03	7.39	6.71	7.23	.....	.....	.....	.....	.....
1880-81.....	178	69	247	62	21	83	31	8	.....	.....	247	193	440	697.10	232.88	929.98	36.69	31.43	36.08	10.61	11.59	10.86	8.44	1.78	2.61	.....	.....	.....	.....	.....
1881-82.....	201	64	265	76	19	95	33	16	.....	.....	265	209	474	729.89	235.27	965.16	49.05	31.03	41.03	6.30	7.22	6.52	5.05	5.12	5.62	.....	.....	.....	.....	.....
1882-83.....	286	64	347	68	13	81	35	8	.....	.....	347	241	588	902.41	270.89	1,173.34	34.76	41.37	36.32	9.31	7.75	8.94	4.90	5.33	4.99	.....	.....	.....	.....	.....
1883-84.....	229	91	320	65	24	89	37	12	.....	.....	320	241	561	965.07	297.36	1,219.62	28.35	34.92	30.90	7.63	6.38	7.34	6.52	6.32	6.99	.....	.....	.....	.....	.....
1884-85.....	234	69	303	56	22	77	58	15	.....	.....	303	231	534	1,009.55	315.55	1,325.08	31.49	28.48	30.64	9.41	7.92	9.36	6.72	6.64	7.41	.....	.....	.....	.....	.....
1885-86.....	206	62	268	57	15	72	49	17	.....	.....	268	206	474	909.45	315.55	1,224.90	31.49	28.48	30.64	9.41	7.92	9.36	6.72	6.64	7.41	.....	.....	.....	.....	.....
1886-87.....	247	71	318	59	10	69	52	14	.....	.....	318	247	565	1,048.97	326.83	1,375.85	30.20	26.69	28.60	8.19	8.65	9.04	6.92	6.72	7.04	.....	.....	.....	.....	.....
1887-88.....	217	67	284	59	10	69	52	14	.....	.....	284	217	501	1,048.97	326.83	1,375.85	30.20	26.69	28.60	8.19	8.65	9.04	6.92	6.72	7.04	.....	.....	.....	.....	.....
1888-89.....	274	71	345	39	6	45	43	6	.....	.....	345	274	619	1,048.97	326.83	1,375.85	30.20	26.69	28.60	8.19	8.65	9.04	6.92	6.72	7.04	.....	.....	.....	.....	.....
1889-90.....	271	81	352	36	6	42	42	8	.....	.....	352	271	623	1,160.62	344.41	1,505.06	30.81	34.47	26.51	8.44	8.71	8.51	6.87	6.96	8.04	.....	.....	.....	.....	.....
1890-91.....	274	81	352	36	6	42	42	8	.....	.....	352	271	623	1,160.62	344.41	1,505.06	30.81	34.47	26.51	8.44	8.71	8.51	6.87	6.96	8.04	.....	.....	.....	.....	.....

1891-92	233	70	303	56	12	68	69	13	82	8	3	11	121	32	138	232	365	1,597	226	64	348	651	575	29	22	05	20	00	21	66	9	86	9	18	9	71	8	14	7	53	8	01	
1892-93	201	84	345	57	10	67	46	23	69	4	1	5	140	41	181	246	374	1,620	1,253	56	357	02	1,852	08	23	08	13	33	20	81	11	41	11	48	11	44	9	38	9	13	9	32	
1893-94	273	88	371	69	13	62	49	16	65	6		6	138	29	167	277	404	1,621	1,243	16	369	91	1,018	07	26	22	41	30	61	28	06	11	16	9	32	10	73	9	10	7	46	8	72
1894-95	293	78	371	68	30	98	40	32	72	1		1	143	36	179	318	384	1,702	1,280	16	386	16	1,067	07	26	98	30	61	28	06	11	16	9	32	10	73	9	10	7	46	8	72	
1895-96	278	92	370	74	15	89	39	14	53	7	1	8	146	41	187	330	405	1,735	1,290	08	379	25	1,069	33	27	81	21	12	26	40	11	31	10	81	11	20	9	14	8	61	9	02	
1896-97	288	88	377	67	17	84	50	44	94	5		5	130	32	162	367	400	1,767	1,290	08	383	82	1,099	90	26	98	18	27	24	34	9	80	8	33	9	47	8	02	6	49	7	67	
1897-98	347	90	437	84	12	96	30	19	49	8	1	9	167	30	197	425	428	1,853	1,388	25	409	75	1,798	00	28	06	19	35	27	35	12	03	7	32	10	96	9	74	6	12	8	94	
1898-99	498	105	603	173	16	189	59	29	88	38	10	4	138	35	183	495	443	1,938	1,438	33	433	51	1,871	54	40	42	17	77	36	48	10	98	8	07	10	31	8	21	6	56	7	85	
1899-1900	434	117	651	118	33	151	52	13	65	8	5	13	152	32	184	599	477	2,076	1,504	00	444	54	1,948	54	35	75	39	75	42	34	12	19	6	83	10	93	9	11	5	38	8	27	
1900-1901	519	136	655	202	33	235	52	25	77	11	6	17	193	33	226	690	516	2,176	1,583	33	453	33	2,066	66	44	10	34	02	42	36	10	10	7	19	9	44	7	87	5	71	7	39	
1901-2	552	154	686	209	39	248	78	20	98	9	11	20	137	40	177	759	557	2,316	1,675	85	518	16	2,194	01	45	26	34	51	45	42	8	17	7	70	8	06	6	24	5	97	6	18	
1902-3	554	180	734	211	50	261	106	25	131	19	6	25	189	69	238	782	587	2,369	1,737	88	553	08	2,291	16	39	73	33	33	38	32	10	88	12	47	11	26	8	17	9	36	8	45	
1903-4	584	182	766	194	42	236	95	35	130	21	13	34	189	54	245	867	625	2,451	1,783	08	577	00	2,360	08	38	87	29	16	36	70	10	60	8	66	10	29	7	98	6	50	7	75	
1904-5	463	174	667	161	53	204	101	42	143	12	9	21	181	55	236	912	639	2,551	1,845	50	598	00	2,446	50	33	70	33	12	33	55	9	19	9	64	7	66	6	88	7	47			
1905-6	421	180	601	173	60	233	94	33	127	29	13	42	150	52	202	1,887	661	2,548	1,887	50	654	50	2,542	00	38	34	37	34	38	07	7	94	7	96	7	94	6	42	6	34	6	40	
1906-7	437	182	619	136	45	181	82	52	134	28	12	40	165	51	216	1,913	683	2,596	1,968	10	671	53	2,569	93	32	60	27	50	31	17	8	69	7	00	8	40	7	09	6	05	6	82	
1907-8	472	171	643	123	39	163	80	30	110	28	5	42	185	70	255	2,110	735	2,733	1,965	70	699	00	2,664	70	31	52	32	77	32	40	7	83	6	43	7	54	6	54	5	27	6	20	
1908-9	517	174	691	133	60	193	52	30	82	35	7	81	189	71	255	2,110	742	2,852	2,061	00	740	66	2,801	66	31	11	34	13	31	99	8	97	9	46	9	10	7	35	7	70	7	44	
1909-10	496	154	650	115	56	171	54	20	74	55	26	122	212	68	280	2,193	723	2,916	2,138	91	734	00	2,872	91	23	00	26	89	24	06	8	87	9	67	9	05	7	25	7	92	7	42	
1910-11	443	180	623	165	50	215	47	13	60	96	26	122	212	68	280	2,193	746	2,867	2,143	33	740	67	2,884	00	31	73	31	85	31	76	9	89	9	19	9	70	8	04	7	52	7	91	
1911-12	543	190	733	160	51	211	33	19	52	72	30	102	258	74	332	2,136	762	2,898	2,124	43	747	32	2,871	75	30	60	29	31	30	01	12	14	9	96	11	52	9	70	7	90	9	24	

Sixty-five "not insane," 54 males and 11 females, are included with recovered in 1911-12.

Nativity of patients admitted during the year and since the opening of the hospital in 1855.

Nativity.	During year.	Since 1855.	Nativity.	During year.	Since 1855.
Native born:			Foreign born—Continued.		
Alabama.....	3	67	Brazil.....		1
Arkansas.....	1	37	British East Indies.....		8
Arizona.....		2	British Columbia.....		1
California.....	5	38	British possessions.....		3
Colorado.....		13	British West Indies.....		14
Connecticut.....		137	Buenos Aires.....		3
Dakota.....		12	Canada.....	7	167
Delaware.....	2	41	Cape Verde Islands.....		1
District of Columbia.....	93	2,592	Chile.....		1
Florida.....	1	24	China.....		2
Georgia.....	8	128	Coast of Africa.....		3
Illinois.....	7	277	Costa Rica.....		1
Indiana.....	13	267	Cuba.....		7
Indian Territory.....		18	Cyprus.....		1
Idaho.....	1	2	Denmark.....	1	53
Iowa.....	8	64	England.....	9	411
Kansas.....	2	52	Ecuador.....		1
Kentucky.....	16	275	Finland.....	1	11
Louisiana.....	1	61	France.....	3	107
Maine.....	1	152	Germany.....	27	1,680
Maryland.....	68	1,503	Greece.....	1	10
Massachusetts.....	6	589	Guatemala.....		1
Michigan.....	5	130	Holland.....		19
Minnesota.....	2	31	Hungary.....		25
Mississippi.....	4	67	Iceland.....		1
Missouri.....	11	165	Ireland.....	26	2,358
Montana.....		3	Italy.....	6	89
Nebraska.....	2	13	Japan.....	3	13
New Hampshire.....	2	96	Korea.....		1
New Jersey.....	10	194	Malta.....		3
New Mexico.....		4	Mexico.....		16
New York.....	37	1,233	New Brunswick.....		4
North Carolina.....	11	189	Newfoundland.....		3
Ohio.....	30	678	New Grenada.....		1
Oklahoma.....		2	Norway.....	2	68
Oregon.....		5	Nova Scotia.....		23
Pennsylvania.....	40	1,036	Panama.....		1
Rhode Island.....	3	60	Philippine Islands.....	1	4
South Carolina.....	6	73	Poland.....		36
Tennessee.....	13	167	Portugal.....		8
Texas.....	3	73	Prince Edward Island.....		3
Utah.....		3	Prussia.....	1	36
Vermont.....	3	78	Porto Rico.....	2	3
Virginia.....	101	2,031	Roumania.....	1	6
West Virginia.....	7	90	Russia.....	6	94
Wisconsin.....	3	84	Hawaiian Islands.....		3
United States.....	84	943	Saxony.....	1	7
Total.....	613	13,789	Scotland.....	1	109
Foreign born:			Sicily.....		3
Alsace.....		1	Spain.....		9
Armenia.....		3	Sweden.....	3	113
Austria.....	3	89	Switzerland.....	3	77
Bahamas.....		1	Turkey.....	1	9
Bavaria.....		17	Wales.....		23
Belgium.....		9	West Indies.....	1	6
Bermuda.....		1	At sea.....		1
Bohemia.....		8	Unascertained.....	10	404
			Total.....	733	19,994

Ages of patients admitted during the year ended June 30, 1912.

Age.	Male.	Female.	Total.	Age.	Male.	Female.	Total.
7 to 15 years.....	5	4	9	50 to 60 years.....	32	20	52
15 to 20 years.....	21	17	38	60 to 70 years.....	57	18	75
20 to 25 years.....	79	14	93	70 to 80 years.....	65	13	78
25 to 30 years.....	70	21	91	80 to 90 years.....	14	5	19
30 to 35 years.....	65	16	81	Over 90 years.....		1	1
35 to 40 years.....	55	29	84	Unknown.....	3	2	5
40 to 45 years.....	45	13	58				
45 to 50 years.....	32	17	49	Total.....	543	190	733

Civil condition of patients admitted during the year ended June 30, 1912.

	Male.	Female.	Total.
Single.....	315	76	391
Married.....	149	72	221
Widowed.....	62	40	102
Divorced.....	5	1	6
Unknown.....	12	1	13
Total.....	543	190	733

Ages of patients who died during the year ended June 30, 1912.

Age.	Male.	Female.	Total.	Age.	Male.	Female.	Total.
15 to 20 years.....	1	4	5	50 to 60 years.....	20	9	29
20 to 25 years.....	3	1	4	60 to 70 years.....	59	14	73
25 to 30 years.....	7	5	12	70 to 80 years.....	71	17	88
30 to 35 years.....	21	4	25	80 to 90 years.....	17	2	19
35 to 40 years.....	19	4	23	Over 90 years.....	.....	2	2
40 to 45 years.....	21	5	26	Total.....	288	74	332
45 to 50 years.....	19	7	26				

Duration of mental disease of patients who died during the year ended June 30, 1912.

Age.	Male.	Female.	Total.	Age.	Male.	Female.	Total.
Under 1 month.....	6	2	8	4 to 6 years.....	13	9	22
1 to 2 months.....	11	5	16	6 to 10 years.....	23	11	34
2 to 4 months.....	15	5	20	10 to 15 years.....	20	4	24
4 to 6 months.....	12	3	15	15 to 20 years.....	9	1	10
6 to 9 months.....	16	3	19	20 to 25 years.....	9	3	12
9 to 12 months.....	13	2	15	Over 25 years.....	31	6	37
12 to 18 months.....	28	4	32	Unascertained.....	2	3	5
18 months to 2 years.....	12	6	18	Total.....	258	74	332
2 to 3 years.....	18	4	22				
3 to 4 years.....	20	3	23				

Ages of patients discharged recovered during the year ended June 30, 1912.

Age.	Male.	Female.	Total.	Age.	Male.	Female.	Total.
15 to 20 years.....	7	3	10	50 to 60 years.....	8	2	10
20 to 30 years.....	44	8	52	60 to 70 years.....	6	.....	6
30 to 40 years.....	27	19	46	Total.....	106	40	146
40 to 50 years.....	14	8	22				

Duration of residence in the hospital of those recovered during the year ended June 30, 1912.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
10 to 20 days.....	5	.....	1	2	8
20 to 30 days.....	2	.....	1	2	5
1 to 2 months.....	9	2	2	3	16
2 to 3 months.....	10	1	1	.....	12
3 to 4 months.....	11	3	1	2	17
4 to 6 months.....	12	1	3	2	18
6 to 9 months.....	12	3	3	1	19
9 to 12 months.....	10	1	.....	2	13
1 to 2 years.....	9	2	6	4	21
2 to 4 years.....	5	.....	1	.....	6
Over 4 years.....	7	1	2	1	11
Total.....	92	14	21	19	146

Forms of mental disease of patients admitted during the year ended June 30, 1912.

Diagnosis.	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Infection—Exhaustion psychosis.....	2	1	2	3	8
Symptomatic psychosis.....	1	1	1	1	2
Toxic psychosis—Exogenous.....	13	1	5	2	19
Alcoholic psychosis.....	1	1	1	1	4
Korsakow's psychosis.....	12	2	3	1	18
Psychosis associated with organic brain disease.....	1	1	1	1	4
Huntington's chorea.....	51	13	9	10	83
Arteriosclerosis, cerebral (dementia).....	10	2	3	3	18
Syphilis, cerebral.....	44	8	1	2	55
Parosis.....	1	1	1	1	4
Tabes dorsalis.....	49	2	16	5	72
Senile dementia.....	11	14	2	2	27
Dementia precox:	13	1	3	1	18
Hebephrenic form.....	31	6	2	1	40
Catatonic form.....	111	6	29	27	173
Paranoid form.....	19	14	3	3	36
Undifferentiated.....	3	2	2	2	9
Manic-depressive psychosis.....	3	2	4	3	12
Involuntional melancholia.....	1	1	2	1	5
Depression, hallucinatory.....	2	1	4	1	8
Psychogenic.....	1	1	2	1	5
Psycho-neurosis.....	3	8	3	1	15
Hysteria.....	3	1	1	1	6
Psychosis associated with epilepsy.....	3	1	1	1	6
Defective states:					
Constitutional inferiority.....			1		1
Prison psychosis.....		2			2
Imbecility.....	2	5	1	6	14
Undifferentiated psychosis.....	22	4	10	2	38
Depression.....	1	3	1	1	6
Excitement.....	1	1	1	2	5
Confusional state.....	1	1	1	1	4
Unclassified psychosis.....	1	2	1	1	5
Not insane.....	46	8	4	4	62
Total.....	455	88	110	80	733

Forms of mental disease in patients discharged as recovered during the year ended June 30, 1912.

	Male.		Female.		Total.
	White.	Colored.	White.	Colored.	
Toxic psychosis—Exogenous:					
Alcoholic psychosis—Korsakow.....	1				1
Acute hallucinosis.....	6		1		7
Acute psychosis, undifferentiated.....	6			2	8
Chronic alcoholism.....	2			2	4
Delirium tremens.....	1		1		2
Manic-depressive psychosis.....	8	1	6	6	21
Dementia precox:					
Hebephrenic form.....	4	3		3	10
Catatonic form.....	6	2			8
Paranoid form.....	4	1	1		6
Undifferentiated.....	29	2	5	1	37
Excitement, undifferentiated.....	2			1	3
Psycho-neurosis.....				1	1
Depression:					
Undifferentiated.....	6	2	5	2	15
Symptomatic.....		1			1
Psychogenetic.....			1		1
Anxiety psychosis.....	1		1		2
Prison psychosis.....	5			1	6
Psychosis of degeneracy.....	1				1
Traumatic psychosis.....	1				1
Psychosis associated with—					
Epilepsy.....	1	1			2
Hysteria.....	1				1
Arteriosclerosis.....	5	1			6
Organic brain disease.....	2				2
Total.....	92	14	21	19	146

Detailed statement of receipts and expenditures for the fiscal year ending June 30, 1911, additional.

RECEIPTS.

On hand as stated in last annual report:

Support	\$22,864.21
Repairs	3,109.71
Miscellaneous receipts	9,828.32
	35,802.24

EXPENDITURES.

Furniture and bedding:

Furniture	\$2,334.42
Table linen	220.00
Carpets, etc.	419.21
	2,973.63

Dry goods and clothing:

Shoes and slippers, men's	313.80
Shoes and slippers, women's	32.00
	345.80

Farm and garden:

Farm and garden implements	1,665.76
Horticultural supplies	265.45
Live stock	647.50
	2,578.71

Miscellaneous:

Return of escaped patients	12.94
Messages	.51
	13.45

Construction:

Engineer's supplies	1,463.00
Electrical supplies	164.60
Carpenter's supplies	424.91
	2,052.51

Books and stationery: Periodicals

4.45

Repairs:

Engineer's supplies	166.34
Carpenters' and builders' supplies	413.29
Construction	1,898.00
	2,477.63

Pay roll: Officers

100.00

Balance in U. S. Treasury:

Support	24,623.98
Repairs	632.08
	25,256.06
	35,802.24

Summary of receipts and expenditures for the fiscal year ending June 30, 1912.

RECEIPTS.

Appropriated for:

Support	\$334,400.00
District of Columbia patients	310,861.49
Marine-Hospital Service patients	10,557.43
Repairs	40,000.00
Reimbursement on repairs (G. Elias & Bro.)	11.88
Buildings and grounds: Roadways, grading, and walks	5,000.00
Board of patients	27,713.09
Sale of stock, etc	6,092.05
Disallowances	.47

On hand:

Buildings and grounds	12,816.69
Power, heating, and lighting plant	90,028.31

837,481.41

EXPENDITURES.

Provisions and stores:

Class 1. Farinaceous food.....	\$29,657.18
Class 2. Yeast.....	626.50
Class 3. Meats, fresh.....	45,198.93
Class 4. Poultry.....	3,537.15
Class 5. Meats, salt and smoked.....	26,586.34
Class 6. Fish, fresh.....	8,002.76
Class 7. Fish, salt.....	2,623.65
Class 8. Vegetables, fresh.....	11,270.08
Class 9. Vegetables, canned.....	3,287.55
Class 10. Fruits, fresh.....	1,308.56
Class 11. Fruits, dried.....	4,165.17
Class 12. Preserves and jellies.....	-----
Class 13. Dairy products.....	24,033.09
Class 14. Groceries, wet.....	4,885.53
Class 15. Groceries, dry.....	31,763.56
Class 16. Condiments.....	168.28
Class 17. Laundry supplies.....	6,613.99
Class 18. Crockery and china.....	1,066.65
Class 19. Tin and iron ware.....	236.51
Class 20. Cutlery and plated ware.....	82.27
Class 21. Household supplies.....	5,163.03
Class 22. Woodenware.....	14.40
Class 23. Toilet articles.....	890.47
Class 24. Fuel.....	56,199.93

 \$267,381.53

Furniture and bedding:

Class 25. Furniture.....	1,912.42
Class 26. Bedding.....	8,005.11
Class 27. Window furniture.....	1,517.06
Class 28. Table linen.....	1,216.22
Class 29. Upholstery and furniture material.....	88.00
Class 30. Sewing-machine supplies.....	53.19
Class 31. Carpets, etc.....	2,445.44

 15,237.44

Dry goods and clothing:

Class 32. Clothing, new.....	3,521.07
Class 33. Clothing material.....	11,377.71
Class 34. Hats, straw.....	184.66
Class 35. Hats, felt.....	316.80
Class 36. Hosiery.....	1,174.85
Class 37. Haberdashery.....	293.64
Class 38. Shoes and slippers, men's.....	4,222.42
Class 39. Shoes and slippers, women's.....	324.70

 21,415.85

Medical supplies:

Class 40. Medical supplies.....	3,767.48
Class 41. Surgical supplies.....	1,752.15
Class 42. Laboratory supplies.....	472.66

 5,992.29

Farm and garden:

Class 43. Wagons and harness.....	751.80
Class 44. Farm and garden implements.....	629.72
Class 45. Lawns, roads, and grounds.....	100.64
Class 46. Farm supplies.....	55.28
Class 47. Horticultural supplies.....	1,338.32
Class 48. Stable maintenance.....	102.88
Class 49. Live stock.....	100.00
Class 50. Farm feed.....	6,426.27
Class 51. Dairy feed.....	18,332.65
Class 52. Poultry feed.....	499.79

 28,337.35

Miscellaneous:

Class 53. Entertainment of patients.....	\$2, 186. 68
Class 54. Traveling expenses.....	1. 50
Class 55. Supply transportation.....	-----
Class 56. Return of escaped patients.....	150. 00
Class 57. Messages.....	1, 312. 99
Class 58. Advertisements.....	-----
Class 59. Miscellaneous.....	825. 42
Class 60. Transportation of patients.....	99. 85

\$4, 576. 44**Books and stationery:**

Class 61. Stationery supplies.....	156. 74
Class 62. Printing.....	24. 77
Class 63. Books.....	263. 73
Class 64. Periodicals.....	401. 02

851. 26**Construction:**

Class 65. Engineer's supplies.....	3, 322. 51
Class 66. Electrical supplies.....	2, 619. 17
Class 67. Carpenter's supplies.....	607. 45
Class 68. Tinner's supplies.....	374. 55
Class 69. Painter's supplies.....	2, 498. 85

9, 422. 53**Repairs:**

Class 70. Pay roll.....	22, 295. 59
Class 71. Engineer's supplies.....	9, 728. 81
Class 72. Carpenter and builder's supplies.....	2, 244. 98
Class 73. Tinner's supplies.....	54. 58
Class 74. Painter's supplies.....	358. 26
Class 75. Construction.....	4, 178. 94

38, 861. 14**Buildings and grounds:**

Class 76. Pay roll.....	4, 024. 54
Class 77. Roadways, grading, and walks.....	6, 083. 60
Class 78. Furniture, new buildings.....	-----
Class 79. Assembly hall.....	-----
Class 80. Power, heating, and lighting plant.....	17, 955. 60
Class 90. Furniture, assembly hall.....	-----
Class 100. Fire-alarm apparatus.....	-----

28, 063. 74**Pay roll:**

Class 81. Officers.....	32, 055. 01
Class 82. Administrative.....	27, 003. 32
Class 83. Ward service.....	118, 494. 74
Class 84. Domestic service.....	3, 097. 06
Class 85. Kitchen service.....	24, 376. 48
Class 86. Industrial.....	5, 616. 00
Class 87. Laundry.....	11, 639. 89
Class 88. Fire department.....	825. 00
Class 89. Engineers.....	33, 610. 05
Class 90. Carpenters and builders.....	6, 144. 30
Class 91. Tinner's.....	1, 841. 75
Class 92. Construction.....	2, 203. 35
Class 93. Painters.....	4, 414. 77
Class 94. Electricians.....	4, 090. 17
Class 95. Farm and garden.....	16, 947. 27
Class 96. Stable.....	6, 065. 03
Class 97. Dairy and cow barns.....	4, 427. 66
Class 98. Lawns and grounds.....	5, 578. 46

309, 430. 31**On hand:**

Support.....	26, 979. 10
Repairs.....	1, 151. 17
Buildings and grounds.....	7, 708. 55
Power, heating, and lighting plant.....	72, 072. 71

107, 911. 53**Total..... 837, 481. 41**

Summary of population.

	Male.	Female.	Total.
Patients at beginning of fiscal year.....	2,116	746	2,862
Patients received during the year.....	243	190	733
Patients discharged and died during year.....	523	174	697
Patients remaining at end of fiscal year.....	2,136	762	2,898
Daily average number of patients during the year.....	2,125	747	2,872
Average number of officers and employees during year.....	538	289	827

*Summary of expenditures.***Current expenses:**

Salaries and wages.....	\$309,430.31
Clothing.....	21,415.85
Subsistence.....	204,567.61
Ordinary repairs.....	9,422.53
Office, domestic, and outdoor expenses.....	117,808.70
Total.....	662,645.00

Extraordinary expenses:

New buildings, land, etc.....	38,861.14
Permanent improvements to existing buildings.....	28,063.74
Total.....	66,924.88
Grand total.....	729,569.88

**REPORT OF THE COLUMBIA INSTITUTION FOR THE
DEAF.**

531

OFFICERS OF THE INSTITUTION.

Patron.—William Howard Taft, President of the United States.
President.—Percival Hall, M. A.
Secretary.—Charles S. Bradley, Esq.
Treasurer.—George X. McLanahan, Esq.
Directors.—Hon. George C. Perkins, Senator from California, Hon. Thetus W. Sims, Member of Congress from Tennessee, Hon. E. L. Taylor, jr., Member of Congress from Ohio, representing the Congress of the United States; Edward Miner Gallaudet, Ph. D., LL. D., of Connecticut; Hon. John W. Foster; Hon. Francis M. Cockrell; R. Ross Perry, Esq., Theodore W. Noyes, Esq., of the District of Columbia; John B. Wight, Esq., of New York; the president and the secretary of the institution.

FACULTY OF GALLAUDET COLLEGE.

Emeritus president and professor of moral and political science.—Edward Miner Gallaudet, Ph. D., LL. D.

President and professor of applied mathematics and pedagogy.—Percival Hall, M. A.

Vice president and professor of languages.—Edward A. Fay, M. A., Ph. D.

Emeritus professor of natural science and lecturer on pedagogy.—Rev. John W. Chickering, M. A.

Professor of English and history.—J. Burton Hotchkiss, M. A., Litt. D.

Professor of mathematics and Latin.—Amos G. Draper, M. A., Litt. D.

Professor of natural science.—Charles R. Ely, M. A., Ph. D.

Professor of physics and biology.—Herbert E. Day, M. A.

Professor of Latin.—Allan B. Fay, M. A.

Instructor in English and in charge of college women.—Elizabeth Peet.

Instructor in mathematics and engineering.—Isaac Allison, E. E.

Physical director.—William Henry Arras, B. A.

Instructor in drawing.—Arthur D. Bryant, B. Ph.

Librarian and instructor in home economics.—Helen Northrop, B. A.

DEPARTMENT OF ARTICULATION AND NORMAL INSTRUCTION.

Professor in charge.—Percival Hall, M. A.

Instructors.—Lyman Steed, M. A.; Annie E. Jameson; Sarah H. Porter, M. A.

Normal fellows.—Clara Anne Lee, B. S., Caldwell College, Kentucky; Mary Hughes McCue, A. B., Synodical College, Missouri; William Crooks McClure, A. B., Central University, Kentucky; Julius J. Helmark, A. B., St. Olaf College, Minnesota.

Normal student.—Burton Wells Driggs, Utah State Normal School, Utah.

FACULTY OF THE KENDALL SCHOOL.

President.—Percival Hall, M. A.

Principal.—Lyman Steed, M. A.

Instructors.—Melville Ballard, M. S.; Helen Fay; Musa Marbut, M. A.; M. Edetha Williams, B. A.; Elizabeth Palmer.

Instructor in art and manual training.—Ida M. Parr.

Instructor in cooking.—Agnes Suman.

Instructor in sewing.—Lydia Suman.

DOMESTIC DEPARTMENT.

Supervisor and disbursing agent.—Louis L. Hooper, M. A.

Attending physician.—Harry H. Donnally, M. D.

Matron.—Mary E. Schenck.

Matron, Kendall School, boys.—Mrs. C. A. R. Crossley.

Matron, Kendall School, girls.—Harriet Van Deventer.

Boys' supervisor.—George W. Harlow.

Girls' supervisor.—Elizabeth M. Paul.

Gardener.—Edward Mangum.

Farmer.—Harley D. Drake, B. A.

REPORT OF THE COLUMBIA INSTITUTION FOR THE DEAF.

COLUMBIA INSTITUTION FOR THE DEAF,
Kendall Green, Washington, D. C., September 23, 1912.

SIR: The number of pupils and students remaining in the institution July 1, 1911, was 93; admitted during the year, 38; admitted for the school year 1912-13, 41; total, 172 (90 males, 82 females). From July 1, 1911, to July 1, 1912, there were under instruction 68 males and 62 females, a total of 130, of whom 85 have been in the collegiate department, representing 27 States, the District of Columbia, and Canada, and 45 in the primary department. Of these, 36 were admitted as beneficiaries of the District of Columbia. During the fiscal year 33 were discharged from the institution by graduation and otherwise.

A list of the names of students and pupils who have been under instruction in this institution since July 1, 1911, will be found appended to this report.

HEALTH.

Excellent health has prevailed during the year among nearly all the students and pupils. Six of the children of the primary department were operated upon for the removal of adenoids and enlarged tonsils, by Dr. Donnally. The benefits of the operations have been marked.

A large number of the new pupils were carefully examined on entrance to discover serious physical disturbances. All new pupils will be examined during the present year.

All employees engaged in the institution dairy work were carefully examined and found in excellent health.

CHANGES IN THE CORPS OF OFFICERS AND TEACHERS.

Dr. D. Kerfoot Shute, for more than 20 years physician of the institution, retired December 31, 1911, to devote himself to special practice. His services as eye specialist have been retained by the institution. The position of physician has been filled by the appointment of Dr. H. H. Donnally.

Mr. Albert F. Adams, for many years instructor in gymnastics, has retired, and Mr. William H. Arras, a graduate of Gallaudet College of last June, has been appointed to fill the position of physical director established by the board of directors.

In the Kendall School, Miss Elizabeth Palmer, of the North Carolina School for the Deaf, has been appointed instructor to fill the

position made vacant by the resignation of Miss Taliaferro and temporarily filled by Miss Winifred Northrop. Miss Ida M. Parr, a graduate of the Oswego Manual Training School, has been made instructor of art and manual training in place of Miss Gertrude L. Dunn, who resigned to accept the position of supervising teacher in the Elizabeth public schools.

Miss Adelaide Waring is succeeded by Miss Agnes Suman as special teacher of cooking.

COURSE OF INSTRUCTION.

The course of instruction was carried out as last reported, with the following additions:

Dairy work and gardening, practical instruction under Mr. Harley D. Drake; floriculture, under Mr. E. D. Mangum; library cataloguing and the science of living, under Miss Helen Northrop. These optional courses interested a considerable number of the students of the college, and will be offered again during the present year.

No educational institution in this vicinity can add to its course good instruction in dairying and gardening with less expense or more profit than ours.

With a modern dairy and farm of over 30 acres already in operation, and with an excellent chemical laboratory where tests of milk, soils, and fertilizers can be made, an additional instructor and a small amount of equipment will provide for the instruction of 15 or 20 young people in agriculture. This is a field in which the deaf are under very little handicap, and in which a number of our graduates have already made marked success. It is hoped that the small sum of money necessary to extend this agricultural training in our institution will be granted for the next fiscal year and thereafter.

LECTURES.

The following special lectures have been delivered during the year:

IN THE COLLEGE.

Some Important Irrigation Projects in the West, by President Hall.
 Primitive Man, by Vice President Fay.
 Suwarrow—A Type of Russian Character, by Dr. Hotchkiss.
 The Spacious Firmament on High, by Dr. Draper.
 Protective Mimicry Among Insects, by Dr. Ely.
 Our Native Americans, Prof. Day.
 Arizona, Prof. A. B. Fay.
 Maetterlinck's Blue Bird, by Miss Peet.

IN THE KENDALL SCHOOL.

Short Stories, by Mr. Steed.
 How a Pot of Broth Saved the Plymouth Settlement, by Mr. Ballard.
 Sigurd, The Mighty, by Miss Long.
 Aladdin and His Wonderful Lamp, by Miss Minhinnette.
 Good Gifts and Fools Folly, by Mr. Iles.
 Sinbad, The Sailor, by Mr. Vigour.
 Ill Luck and the Fiddler, by Mr. Skyberg.

FINANCES.

Receipts and expenses, July 1, 1911-June 30, 1912.

	Receipts.	Expenses.
Commissary Department:		
Wages.....		\$4,987.00
Provisions.....		15,632.13
Ice.....		392.28
Supplies.....		653.01
Equipment.....		618.60
Sundries.....		92.30
Board.....	\$476.90	
Total.....	476.90	22,382.32
Administration:		
Salaries.....		2,827.13
Supplies.....		324.25
Communication services.....		584.33
Freight and express.....		95.70
Printing.....		279.04
Auditing and account books.....		431.74
Equipment.....		513.98
Sundries.....		3.79
Total.....		5,060.01
Grounds:		
Wages.....		3,002.81
Supplies.....		332.77
Equipment.....		187.30
Sundries.....		477.50
Total.....		4,000.38
Laundry:		
Wages.....		1,122.95
Supplies.....		78.96
Equipment.....		24.11
Sundries.....	25.55	
Total.....	25.55	1,226.02
Farm:		
Wages.....		2,250.26
Feed.....		1,933.00
Plants and seeds.....		136.23
Live stock.....		1,298.00
Equipment.....		412.90
Repairs.....		112.67
Board.....		474.75
Sundries.....		346.58
Fruit and vegetables.....	98.53	
Milk.....	3,647.04	
Live stock.....	490.74	
Board of horses.....	646.40	
Poultry and eggs.....	78.53	
Sundries.....	235.08	
Total.....	5,196.62	6,973.39
Gallaudet College:		
Salaries.....		22,007.36
Wages.....		758.19
Supplies.....		120.99
Equipment.....		436.93
Medical expenses.....		371.69
Sundries.....		24.20
Total.....		23,719.36
Stable and garage:		
Wages.....		600.00
Supplies.....		3.34
Board of horses.....		382.40
Equipment.....	161.72	
Sundries.....		61.75
Total.....	161.72	1,047.49
Library and laboratory:		
Books.....		339.48
Apparatus and supplies.....		197.62
Equipment.....		6.17
Sundries.....		9.10
Total.....		552.37

Receipts and expenses, July 1, 1911-June 30, 1912—Continued.

	Receipts.	Expenses.
Repairs:		
Wages		\$3,447.24
Supplies		3,441.96
Equipment		64.94
Contracts		4,847.57
Total		11,801.71
Kendall School:		
Salaries		9,143.46
Wages		364.90
Supplies		393.75
Equipment		320.14
Medical expenses		469.43
Sundries		106.43
Total		10,797.11
Light, heat, and power:		
Wages		1,097.65
Gas and illuminating oil		1,364.73
Coal		2,464.76
Supplies		104.17
Equipment		39.64
Total		5,070.94
Dairy, milkhouse, and greenhouse (from special appropriation):		
Wages		2,774.44
Materials and supplies—		
Metals and metal products		1,232.40
Nonmetallic mineral products		225.53
Lumber and wood products		1,275.23
Paints and painters' material		33.81
Contracts—		
Brickwork		1,637.60
Excavating and cement work		1,606.53
Repairing greenhouse		1,112.00
Slating		597.97
Plumbing		383.25
Steamfitting		300.00
Electric wiring		280.00
Plastering		265.00
Lightening rods		93.00
Miscellaneous		680.80
Sundries		.45
Total		12,500.00
Sundries:		
Traveling		401.78
Student advances, expenses		875.52
Student advances, receipts	\$605.38	
Sundry expenses		163.26
Sundry receipts	209.86	
Total	815.24	1,440.56
Receipts:		
United States appropriation, current expenses, 1912	82,472.50	
United States appropriations, buildings	12,500.00	
Tuition	5,250.00	
Total	100,222.50	
Grand total	106,898.53	106,571.66
Less credits and debits between different accounts	5,062.02	5,062.02
Actual cash receipts and expenses	101,836.51	101,509.64
Cash on hand July 1, 1911	935.68	
Cash on hand July 1, 1912		1,282.55
Total	102,772.19	102,772.19

**ESTIMATES FOR THE FISCAL YEAR ENDING JUNE
30, 1914.**

The following estimates for the fiscal year ending June 30, 1914, have already been submitted:

For the support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, \$81,900.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements and roadways within the grounds, \$10,000.

For the removal of the college women's dormitory and the construction, equipment, and furnishing of a new dormitory to replace it, and for necessary repairs to walks and grading of grounds adjacent to said dormitory, \$85,000.

For special repairs and improvements in the lighting, heating, and power plant and system, \$25,000.

These last improvements would include the installation of the vacuum system of heating, wiring buildings now using gas, installation of steam cookers in main kitchen, new engines, mechanical stokers, etc. They would mean a saving of at least \$1,000 per year in cost of fuel and much more efficient heating and lighting in our institution, according to the estimate of a competent engineer.

SURVEY OF GROUNDS.

During the past spring an official survey and plat of the grounds of the institution were made by the force of the surveyor of the District of Columbia, and 12 stones were set at important corners and points on the boundary line. The west line of West Virginia Avenue was definitely given as a boundary of the southeastern portion of the grounds. The area given by the official survey is slightly over 103 acres. The grade of West Virginia Avenue, as already decided, is considerably above that of our grounds adjacent, making advisable in the near future the filling in of probably 50,000 to 60,000 cubic yards of material to bring this portion of the grounds up to a proper grade.

INVENTORY OF PROPERTY.

An inventory of all the movable property of the institution, furniture, stores, tools, equipment, etc., and a catalogue of the library are nearing completion. The inventory will be made annually hereafter.

OCCUPATIONS OF GRADUATES.

An investigation of the occupations of the 117 young men and women who have received bachelor's degrees from our advanced department, Gallaudet College, during the past 12 years, shows the following interesting result:

Dental student.....	1
Sculptor.....	1
Electrician.....	1
Minister to the deaf.....	1
Deceased.....	2
Supervisors.....	2
Civil-service employees.....	4
At home (young ladies).....	4
Not reported.....	10
Farmers.....	11
Business.....	17
Married (young ladies).....	23
Teachers.....	40
Total.....	117

This table, it is believed, answers at once any question of the benefit of the higher education given to deaf young people in our institution.

It would be hardly possible for these young people to succeed in the civil service or as ministers or teachers without the education received from this institution. A number of the young ladies reported as married have spent a number of years as successful teachers before marriage.

Besides these 117 graduates, there has been a considerably larger number of young people during this 12-year period who have received the benefit of higher education for one or more years in our college and have been thus made happier and more useful citizens.

MEETING OF ORAL TEACHERS.

A meeting of the Association to Promote the Teaching of Speech to the Deaf was held in the city of Providence in the buildings of the Rhode Island School for the Deaf from June 27 to July 2. A number of interesting papers were presented.

Our institution was represented by the president, Dr. Fay, Miss Jameson, Mr. Steed, and Miss Fay.

INTERNATIONAL CONGRESS OF THE DEAF.

The two hundredth anniversary of the birth of the Abbé de l'Épée, the real founder of public education of the deaf, was celebrated in Paris during August by an international congress of the deaf.

Our institution was represented by Dr. Edward Miner Gallaudet, formerly president, and now a director of the institution, who was invited to read a paper before the Congress.

Dr. T. F. Fox, one of the American delegates, a graduate of Gallaudet College, received a decoration from the French Government, and Dr. Gallaudet was made a chevalier of the Legion of Honor in recognition of his great services in the education of the deaf.

EXERCISES OF PRESENTATION DAY.

The public anniversary of the college was held in the college chapel on Wednesday, May 1.

Rev. Frank Sewall, S. T. D., offered the opening prayer.

The orations, delivered by members of the graduating class, were as follows:

Books, by Archibald Wright, jr., Canada.

The Invisible Empire, Shelby Wynne Harris, Mississippi.

They Also Serve, by Tom Lewis Anderson, Texas.

The Woman of To-day and the Law, Anna Vaughan Johnson, Nebraska.

Candidates for degrees were presented by Dr. Charles R. Ely; Dr. Edward A. Fay, vice president of the college; and President Hall, as follows:

For the degree of master of arts.

Normal fellows.

Victor O. Skyberg, B. A., St. Olaf College, Minnesota.

Edmiston W. Iles, B. A., University of Kansas.

Harry Vigour, B. A., Baker University, Kansas.

Beatrice Edwina Minhinnette, B. A., Shorter College, Georgia.

For the degree of bachelor of arts.

Olga Maria Anderson.

Tom Lewis Anderson.

William Henry Arras.

Vernon Sterling Birk.

Ora Harrison Blanchard.

Luverne Stephen Byrne.

Annie Louise Dwight.

Petra Theodora Fandrem.

Harry Gardner.

Shelby Wynne Harris.

Virginia Anne Haywood.

Anna Vaughan Johnson.

Leon Putnam Jones.

Adolph Nicholas Struck.

Archibald Wright, jr.

For the degree of bachelor of philosophy.

Alice Stewart Hammond.

For the degree of bachelor of letters.

Helena Froelich.

Mabel Jennie Jensen.

William Ferdinand Schaefer.

Hubert Beck West.

Normal student.

Edith Una Long, Council Bluffs High School, Iowa.

Dr. Ulysses Pierce, pastor of All Souls Church, addressed the candidates on "The Truly Educated Man."

The exercises were closed with a benediction by the Rev. Arthur D. Bryant, missionary to the deaf of Washington, D. C.

CONFERRING OF DEGREES.

On the closing day of the term, June 19, degrees were conferred in accordance with the recommendations of presentation day upon all the candidates who had complied with the requirements of the faculty, with the following exceptions:

Having made up all conditions, Misses Jensen and Froelich were granted the degree of bachelor of arts instead of bachelor of letters.

Having made up necessary requirements, Mr. Ferdinand Schaefer was granted the degree of bachelor of philosophy instead of bachelor of letters.

Miss Petra Theodora Fandrem was granted her degree in September.

All of which is respectfully submitted.

PERCIVAL HALL, *President.*

The SECRETARY OF THE INTERIOR.

CATALOGUE OF STUDENTS AND PUPILS. IN THE COLLEGE.

Arkansas:

Ora H. Blanchard.
A. W. Patterson.

California:

Edith Nelson.

Colorado:

Mabel J. Jensen.
John C. Clesson.
Harry Gardner.
Winfield Roller.

Connecticut:

Walter C. Rockwell.
Michael Lapides.
James Sullivan.

District of Columbia:

Maud E. Edlington.
Henry J. Stegemerten.

Idaho:

Clifford M. Thompson.

Indiana:

Leon P. Jones.

Iowa:

Luverne S. Byrne.
Hubert M. West.
Leonard Rendall.
Arthur Rasmusson.
Florence Hetts.
Fern Herrinton.
Jessie Litzenberg.
Pearl Pollock.
Grace Evans.
Hugh S. Courter.
Mabel Pearson.
Charles J. Schmidt.

Kansas:

Dora Campbell.
Ralph Decker.
Edward S. Foltz.
Fred Moore.
Cora A. Denton.
William Schafer.
Ethel Wickham.
Ruth Williams.
Ruth Atkins.
Melvin Davidson.
Le Roy J. Davis.
Elpha Pope.

Kentucky:

Adolph N. Struck.
Ashland Martin.
Kate H. Martin.
Amy Fowler.

Manitoba:

Archibald Wright, jr.

Maryland:

William F. Miller.

Minnesota:

Petra F. Fandrem.
John M. Jacobson.

Mississippi:

Shelby W. Harris.
Fred P. Armstrong.
L. S. Pearson, jr.
Lily A. Gwin.

Missouri:

Jennie F. Susman.
Russell R. Shannon.
Carl Smith.
Ruby McCullough.

Nebraska:

Vernon Butterbaugh.
Charles Blasing.
Anna V. Johnson.
Rula Burt.
Eugene Hogle.
Nellie Johnson.
Stacia Kuta.
Eva Redmon.
Frank Andrewjeski.
Gladys Clark.
Scott Cuscaden.
Emil Hladik.
Charles Marshall.
Ellen Pearson.
Oscar Trenke.

New York:

Vernon S. Birk.
Margaret S. Sherman.
Frederick F. Fancher.
Clinton B. F. Ensworth.

North Carolina:

Virgie A. Haywood.
Oscar Hunter.
L. W. Alderman.
Malina Parker.

North Dakota:

Olga Anderson.

Ohio:

William H. Arras.
Helena Froelich.
Ruth Knox.
Frances Rumsey.

Pennsylvania:

Mary H. Burns.
Hume L. Battiste.
J. Wilbur Gledhill.
Frederick H. Hughes.
W. G. Durian.
Rebecca Rosenstein.
Louise Sadelmyer.

South Carolina:

Annie L. Dwight.

South Dakota :

Edward Dore, jr.
 Flossie Holisington.
 Maria E. Johnson.
 Genevieve Schachte.

Texas :

Mary B. Sharp.
 Thomas L. Anderson.
 Grover C. Farquhar.

Utah :

Alfred C. Keeley, jr.
 Kate Orr Keeley.

Virginia :

Winning McInturff.

Washington :

Alice S. Hammond.
 Elsie T. Peterson.
 Mabel Scanlon.
 Arthur B. Classen.
 Frank H. Thompson.

West Virginia :

Narcissa Watts.

Wisconsin :

Harold Linde.

KENDALL SCHOOL.**Alabama :**

James Johnson.

Delaware :

Robert Johnston.
 Harry Miller.
 Edward Lynch.
 Ida Ellingsworth.
 Florence Johnston.
 Ellen J. McCabe.
 Olivia Peterson.
 Pearl Roberts.
 Mabel M. Sines.
 Glendora Taylor.

District of Columbia :

Raymond Allen.
 Benjamin Beaver.
 Antonio Cichino.
 Frank Berman.
 Morton W. Galloway.
 William Gardner.
 William A. Gray.
 Frederick D. Hill.
 R. Emmet Kenny.
 William U. Lynch.
 John C. Miller.
 Lee Minter.
 Cecil Moore.
 James A. Nash.
 Louis Pucci.
 Francis E. Ridgeway.
 Leonard Stark.
 Charles Sullivan.
 Robert Werdig.

District of Columbia—Continued.

Annie Ball.
 Mary E. Blocher.
 Myrtle E. Connick.
 Louise Golding.
 Madeline Glenn.
 Eleanor Gleason.
 Frances Goetz.
 Elsie Hutchins.
 Fannie Hoke.
 Matilda Maddox.
 Matilda Moore.
 Mildred Miller.
 Annie P. Neitzey.
 Virgie E. O'Neill.
 Rosie Norcia.
 Pearl J. Pearson.
 Florence Reed.
 Sophia Stansbury.
 Laura Sykes.
 Florence Young.

Illinois :

Wallace Gibson.

North Carolina :

Robert Bulluck.

Pennsylvania :

Curtin Wilhelm.

West Virginia :

Hope Ormsby.
 Lulu Watts.
 Roxie Wickline.

Ontario :

Elsie Burke.

REGULATIONS.

I. The academic year is divided into three terms, the first beginning on the Thursday before the last Thursday in September, and closing on the 21st of December; the second beginning the 2d of January and closing the last of March; the third beginning the 1st of April and closing the Wednesday before the last Wednesday in June.

II. The vacations are from the 24th of December to the 2d of January and from the Wednesday before the last Wednesday in June to the Thursday before the last Thursday in September.

III. There are holidays at Thanksgiving, Washington's Birthday, Easter, and Decoration Day.

IV. The pupils may visit their homes during the regular vacations and at the above-named holidays, but at no other time unless for some special urgent reason, and then only by permission of the president.

V. The bills for the maintenance and tuition of pupils supported by their friends must be paid semiannually in advance.

VI. The charge for pay pupils is \$350 per annum. This sum covers all expenses in the primary department except clothing, and all in the college except clothing and books and extraordinary medical attention.

VII. All deaf mutes of teachable age, of good mental capacity, and properly belonging to the District of Columbia, are received without charge. To students from the States and Territories who have not the means of defraying all the expenses of the college course the board of directors renders such assistance as circumstances seem to require, so far as the means at its disposal will allow.

VIII. It is expected that the friends of the pupils will provide them with clothing, and it is important that upon entering or returning to the institution they should be supplied with a sufficient amount for an entire year. All clothing should be plainly marked with the owner's name.

IX. All letters concerning pupils or applications for admission should be addressed to the president.

X. The institution is open to visitors during term time on Thursdays only between the hours of 9 a. m. and 3 p. m. Visitors are admitted to chapel services on Sunday afternoons at 3 o'clock.

APPENDIX.

THE ACTS OF CONGRESS RELATING TO THE COLUMBIA INSTITUTION FOR THE INSTRUCTION OF THE DEAF.

Act of February 16, 1857 (11 Stat. L., 161-162).

AN ACT To incorporate the Columbia Institution for the Instruction of the Deaf and Dumb and the Blind.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Byron Sunderland, J. C. McGuire, David A. Hall, and George W. Riggs, of Washington City, William Edes and Judson Mitchell, of Georgetown, and Amos Kendall and William Stickney, of the county of Washington, and such persons as may hereafter be associated with them by contributions for the instruction of the deaf and dumb and the blind, are hereby created a body politic and corporate, under the name of the "Columbia Institution for the Instruction of the Deaf and Dumb and the Blind," to have perpetual succession, and be capable to take, hold, and enjoy lands, tenements, hereditaments, and personal property, to use a common seal, and the same to alter at pleasure: *Provided*, That no real or personal property shall be held by said corporation except such as may be necessary to the maintenance and efficient management of said institution.

SEC. 2. *And be it further enacted*, That the institution shall be managed as provided for in its present constitution and such additional regulations as may from time to time be found necessary; but as soon as sufficient contributions shall have been paid in to authorize an election according to the provisions of said constitution, the provisional officers therein named shall give notice of a general meeting to the contributors for the election of officers; and the officers elected at such general meeting shall hold their offices for one year and until their successors shall be elected as in said constitution provided: *Provided*, That said constitution may be altered in the manner therein provided, but not in such manner as to violate the Constitution or any law of the United States or of the District of Columbia.

SEC. 3. *And be it further enacted*, That it shall be the duty of the justices of the peace in the several wards of the cities of Washington and Georgetown, and of the county of Washington, to ascertain the names and residences of all deaf and dumb and blind persons within their respective wards and districts, who of them are of a teachable age, and also who of them are in indigent circumstances, and report the same to the president of the institution hereby incorporated.

SEC. 4. *And be it further enacted*, That whenever the Secretary of the Interior shall be satisfied by evidence produced by the president of the institution hereby incorporated that any deaf and dumb or blind person of teachable age properly belonging in this District is in indigent circumstances and can not command the means to

secure an education it shall be his duty to authorize the said person to enter the said institution for instruction and to pay for his maintenance and tuition therein, at the rate of one hundred and fifty dollars per annum for such deaf and dumb pupil and at the rate of one hundred and fifty dollars per annum for such blind pupil, payable quarterly out of the Treasury of the United States.

SEC. 5. *And be it further enacted*, That it shall be lawful for said institution to receive and instruct deaf and dumb and blind persons from any of the States and Territories of the United States on such terms as may be agreed upon by themselves, their parents, guardians, or trustees, and the proper authorities of the said institution.

SEC. 6. *And be it further enacted*, That it shall be the duty of the president and directors of said institution to report to the Secretary of the Interior the condition of said institution on the first day of July in each year, embracing in said report the number of pupils of each description received and discharged during the preceding year and the number remaining in the institution; also the branches of knowledge and industry taught, and the progress made therein; also a statement showing the receipts of the institution, and from what sources, and its disbursements, and for what objects.

Act of May 29, 1858 (11 Stat. L., 293-294).

AN ACT To amend the "Act to incorporate the Columbia Institution for the Instruction of the Deaf and Dumb and the Blind," approved February sixteenth, eighteen hundred and fifty-seven.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in addition to the provision made in the above-recited act for the maintenance and tuition of pupils in the said institution, the sum of three thousand dollars per annum, payable quarterly, shall be allowed for five years, for the payment of salaries and incidental expenses of said institution, and that three thousand dollars be, and is hereby, appropriated for the present fiscal year, payable out of any moneys in the Treasury not otherwise appropriated.

SEC. 2. *And be it further enacted*, That the deaf and dumb and the blind children of all persons in the military or naval service of the United States, while such persons are actually in such service, shall be entitled to instruction in said institution on the same terms as deaf and dumb and blind children belonging to the District of Columbia.

SEC. 3. *And be it further enacted*, That all receipts and disbursements under this act shall be reported to the Secretary of the Interior, as required in the sixth section of the act to which this is an amendment.

Act of June 12, 1858 (11 Stat. L., 321).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending the thirtieth of June, eighteen hundred and fifty-nine.

* * * * *

For salaries and incidental expenses of the Institution for the Instruction of the Deaf, Dumb, and Blind in the District of Columbia authorized by the act approved May twenty-ninth, eighteen hundred and fifty-eight, three thousand dollars.

* * * * *

Act of March 3, 1859 (11 Stat. L., 428).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and sixty.

* * * * *

For salaries and incidental expenses of the Institution of the Deaf, Dumb, and Blind in the District of Columbia, three thousand dollars.

* * * * *

Act of June 13, 1860 (12 Stat. L., 30-31).

AN ACT To dissolve the Washington's Manual Labor School and Male Orphan Asylum Society of the District of Columbia and to authorize the transfer of its effects to the Columbia Institution for the Instruction of the Deaf and Dumb and the Blind.

Be it enacted by the Senate and House of Representatives of the United States in Congress assembled, That the trustees of Washington's Manual Labor School and Male Orphan Asylum Society of the District of Columbia, incorporated by an act of Congress approved on the thirteenth day of June, eighteen hundred and forty-two, be, and they are hereby, authorized and empowered, by deed or other instrument in writing, to transfer all their funds and property of every description to the Columbia Institution for the Instruction of the Deaf and Dumb and the Blind, incorporated by an act of Congress approved February sixteenth, eighteen hundred and fifty-seven, on such terms and conditions as may be agreed upon by said corporate bodies, and incorporated in such deed or instrument of writing.

SEC. 2. *And be it further enacted,* That the said deed of transfer or instrument of writing shall be recorded in the recorder's office for land titles, in the county of Washington and District of Columbia, and the terms and conditions of said deed shall be as obligatory upon said Columbia Institution as if they formed a part of its charter; and from the date of the record thereof, as aforesaid, the trustees of Washington's Manual Labor School and Male Orphan Asylum Society shall be forever thereafter absolved from their trust, and the act of June thirteenth, eighteen hundred and forty-two, conferring upon them corporate powers and privileges shall be thenceforward repealed: *Provided,* That all the debts and pecuniary liabilities of the said Washington's Manual Labor School and Male Orphan Asylum shall be transferred to, assumed by, and be debts of the said Columbia Institution for the Instruction of the Deaf and Dumb and the Blind, which shall be responsible therefor, and suits at law or in equity may be commenced against said last-mentioned corporation the same as if said debts had been originally incurred by it.

Act of June 25, 1860 (12 Stat. L., 109).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and sixty-one.

* * * * *

For salaries and incidental expenses of the Institution of the Deaf, Dumb, and Blind in the District of Columbia, three thousand dollars.

* * * * *

Act of March 2, 1861 (12 Stat. L., 217).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and sixty-two.

* * * * *

For salaries and incidental expenses of the Institution of the Deaf, Dumb, and Blind in the District of Columbia, three thousand dollars.

* * * * *

Act of March 15, 1862 (12 Stat. L., 369-370).

AN ACT To amend "An act to incorporate the Columbia Institution for the Instruction of the Deaf and Dumb and the Blind," and to make appropriations for the benefit thereof.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of four thousand four hundred dollars per annum, payable quarterly, shall be allowed for the payment of salaries and incidental expenses of said institution; and that four thousand four hundred dollars be, and is hereby, appropriated for that purpose, out of any moneys in the Treasury not otherwise appropriated, for the fiscal year ending June thirtieth, eighteen hundred and sixty-three.

SEC. 2. *And be it further enacted,* That the sum of nine thousand dollars be, and the same is hereby, appropriated, out of any moneys in the Treasury not otherwise appropriated, for the erection, furnishing, and fitting up of two additions to the buildings of said institution.

SEC. 3. *And be it further enacted,* That all receipts and disbursements under this act shall be reported to the Secretary of the Interior, as required in the sixth section of the act to which this is an amendment.

Act of March 3, 1863 (12 Stat. L., 747).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and sixty-four, and for the year ending June thirtieth, eighteen hundred and sixty-three, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB AND THE BLIND.

For salaries and incidental expenses of said institution, four thousand four hundred dollars.

For supplying the institution buildings with gas, making apparatus and fixtures, one thousand four hundred and seventy dollars.

For supplying the institution buildings with steam-heating apparatus, two thousand two hundred and fifty dollars.

* * * * *

Act of April 8, 1864 (13 Stat. L., 45).

AN ACT To authorize the Columbia Institution for the Deaf and Dumb and the Blind to confer degrees.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the board of directors of the Columbia Institution for the Instruction of the

Deaf and Dumb and the Blind be, and they are hereby, authorized and empowered to grant and confer such degrees in the liberal arts and sciences to such pupils of the institution or others, who, by their proficiency in learning or other meritorious distinction, they shall think entitled to them, as are usually granted and conferred in colleges, and to grant to such graduates diplomas or certificates, sealed and signed in such manner as said board of directors may determine, to authenticate and perpetuate the memory of such graduation.

Act of July 2, 1864 (13 Stat. L., 349).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and sixty-five, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB AND THE BLIND.

For salaries and incidental expenses, embracing, in addition to the objects heretofore provided for in this appropriation, the salary of an additional teacher, construction of a new sewer, and the construction and repair of fences, seven thousand five hundred dollars.

For continuing the work for the accommodation of the students and inmates in said institution, in addition to the appropriations heretofore made, viz: For the purchase of a tract of improved land containing about thirteen acres, bordering on Boundary Street, of the city of Washington, and adjoining the lot now belonging to the institution, to enable it to instruct the male pupils in horticulture and agriculture, and to furnish sites for mechanic shops and other necessary buildings, twenty-six thousand dollars: *Provided*, That before the purchase of the said thirteen acres is consummated, the owner shall complete the title in fee to the premises now held and occupied by said institution, by executing a release or conveyance of the remainders and reversions now outstanding in him to the said institution.

To bring the Potomac water into the institution from the nearest water mains, or other adequate sources in the city, three thousand two hundred dollars.

* * * * *

Act of February 23, 1865 (13 Stat. L., 436).

AN ACT To amend an act entitled "An act to incorporate the Columbia Institution for the Instruction of the Deaf and Dumb and the Blind," approved February sixteenth, eighteen hundred and fifty-seven.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That so much of the said act as requires the teaching of the blind in said institution be, and the same is hereby, repealed, and the corporate name and style thereof shall hereafter be "The Columbia Institution for the Instruction of the Deaf and Dumb."

SEC. 2. *And be it further enacted*, That the Secretary of the Interior be, and he is hereby, authorized to cause all indigent blind children who are now, or may hereafter become, entitled, under the law as it now exists, to instruction in said institution, to be instructed in

some institution for the education of the blind in Maryland, or some other State, at a cost not greater for each pupil than is, or may be for the time being, paid by such State, and to cause the same to be paid out of the Treasury of the United States.

SEC. 3. *And be it further enacted*, That this act shall take effect from and after the thirtieth day of June, eighteen hundred and sixty-five.

Act of April 7, 1866 (14 Stat. L., 21).

AN ACT Making additional appropriations and to supply the deficiencies in the appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and sixty-six, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For salaries and incidental expenses, including five hundred dollars for the purchase of books and illustrative apparatus, twelve thousand five hundred dollars.

For the erection, furnishing, and fitting up of two extensions to the buildings, to provide enlarged accommodations for the male department, and to furnish rooms for the instruction of the pupils in useful labor, thirty-nine thousand four hundred and forty-five dollars and eighty-seven cents.

For the proper inclosure, grading, and improvement of the grounds of the institution, three thousand five hundred dollars.

* * * * *

Act of July 28, 1866 (14 Stat. L., 317).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and sixty-seven, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including five hundred dollars for books and illustrative apparatus, twenty thousand seven hundred dollars.

For the erection, furnishing, and fitting up of two extensions to the buildings, to provide enlarged accommodations for the male and female pupils and the resident officers of the institution, thirty-two thousand two hundred and forty dollars.

For the erection of a brick barn, carriage house, cow house, shop, gas house, and ice house, fourteen thousand five hundred dollars.

For the improvement and inclosure of the grounds of the institution, including underdrainage and sewerage, four thousand five hundred dollars.

* * * * *

Act of March 2, 1867 (14 Stat. L., 464-465).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and sixty-eight, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including one thousand dollars for books and illustrative apparatus, twenty-five thousand dollars: *Provided*, That deaf-mutes, not exceeding ten in number, residing in the several States and Territories of the United States, applying for admission to the collegiate department of the institution, shall be received on the same terms and conditions as those prescribed by law for residents of the District of Columbia, at the discretion of the president of the institution.

For the erection, furnishing, and fitting up of additions to the buildings of the institution, to provide enlarged accommodations for the male and female pupils and the resident officers of the institution, fifty-four thousand six hundred and seventy-five dollars.

For the enlargement and further improvement of the grounds of the institution, including underdrainage, seven thousand five hundred dollars.

To furnish an increased supply of Potomac water and for the erection of tanks to regulate the distribution thereof, five thousand dollars, to be expended under the direction of the president of the institution.

* * * * *

Act of July 27, 1868 (15 Stat. L., 232-234).

AN ACT Making appropriations for the service of the Columbia Institution for the Instruction of the Deaf and Dumb, and establishing additional regulations for the government of the institution, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, out of any moneys in the Treasury not otherwise appropriated, for the benefit of the Columbia Institution for the Instruction of the Deaf and Dumb.

For the support of the institution, in addition to the existing appropriation to meet the increased expense of maintaining pupils whose admission was authorized by an act of Congress approved March second, eighteen hundred and sixty-seven, three thousand dollars.

For continuing the work upon buildings of the institution in accordance with the plans heretofore submitted to Congress, forty-eight thousand dollars.

Sec. 2. *And be it further enacted*, That in addition to the directors whose appointment has heretofore been provided for by law there shall be three other directors appointed in the following manner: One Senator by the President of the Senate and two Representatives by the Speaker of the House; these directors to hold their offices for the term of a single Congress and to be eligible to a reappointment.

SEC. 3. *And be it further enacted*, That no part of the real or personal property now held or hereafter to be acquired by said institution shall be devoted to any other purpose than the education of the deaf and dumb, nor shall any portion of the real estate be aliened, sold, or conveyed except under the authority of a special act of Congress.

SEC. 4. *And be it further enacted*, That so much of the act of February sixteenth, eighteen hundred and fifty-seven, as allows the payment of one hundred and fifty dollars per annum for the maintenance and tuition of each pupil admitted by order of the Secretary of the Interior be, and the same is hereby, repealed.

SEC. 5. *And be it further enacted*, That the number of students in the collegiate department from the several States, as authorized by the act of March second, eighteen hundred and sixty-seven, shall be increased from ten to twenty-five in number.

SEC. 6. *And be it further enacted*, That the following sums be, and the same are hereby, appropriated for the purposes hereinafter expressed, for the fiscal year ending June thirtieth, eighteen hundred and sixty-nine.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including one thousand dollars for books and illustrative apparatus, twelve thousand and five hundred dollars.

For the proper inclosure, improvement, and enlargement of the grounds of the institution in accordance with plans heretofore submitted to Congress, three thousand and six hundred dollars. * * *

SEC. 7. *And be it further enacted*, That the superintendent of the said Columbia Institution for the Deaf and Dumb shall, at the commencement of every December session of Congress, make a full and complete statement of all the expenditures made by virtue of any appropriations by Congress. Said statement shall include the amount paid to said superintendent, and also for teachers, to whom paid, and the rate at which paid. * * *

* * * * *

Act of March 3, 1869 (15 Stat. L., 310).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and seventy, and for other purposes.

* * * * *

To enable the Secretary of the Interior to provide for the proper maintenance and tuition of the beneficiaries of the United States in the Columbia Institution for the Deaf and Dumb for the year ending June thirtieth, eighteen hundred and sixty-nine, seventeen thousand five hundred dollars.

For the maintenance and tuition of the same for the year ending June thirtieth, eighteen hundred and seventy, thirty thousand dollars.

* * * * *

Act of July 15, 1870 (16 Stat. L., 294).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and seventy, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For support of the institution, including salaries and incidental expenses, and the maintenance of the beneficiaries of the United States, forty thousand seven hundred and seventy-five dollars: *Provided*, That the number of students in the collegiate department from the several States authorized by the acts of March second, eighteen hundred and sixty-seven, and July twenty-seventh, eighteen hundred and sixty-eight, may be increased to forty; but no student now at said institution, coming from said States under said acts, shall be supported therein by the United States from and after the thirtieth day of June, eighteen hundred and seventy-one, and no student hereafter coming to said institution from either of said States under said acts and this act shall be supported by the United States during any portion of the time he remains therein.

For completion of the main central building, ninety-four thousand and eighty-seven dollars.

* * * * *

Act of March 3, 1871 (16 Stat. L., 500).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-two, and for other purposes.

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the supply of the institution, including salaries and incidental expenses, the maintenance of the beneficiaries of the United States, and five hundred dollars for books and illustrative apparatus, forty thousand five hundred dollars.

For continuing the work on the inclosure and improving and grading the grounds of the institution, six thousand dollars.

For necessary expenses in the erection, furnishing, and fitting up of the buildings of the institution, in accordance with plans heretofore submitted to Congress, eighteen thousand dollars.

* * * * *

Act of May 18, 1872 (17 Stat. L., 131).

AN ACT Making appropriations to supply deficiencies in the appropriations for the service of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-two, and for former years, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For furnishing and fitting up the buildings of the institution, six thousand dollars.

For repairs of buildings of said institute during fiscal year ending June thirtieth, eighteen hundred and seventy-two, three thousand five hundred dollars.

* * * * *

Act of June 10, 1872 (17 Stat. L., 360).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-three, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including salaries and incidental expenses, the maintenance of the beneficiaries of the United States, and five hundred dollars for books and illustrative apparatus, forty-eight thousand dollars.

For continuing the work on the inclosure and improvement and grading of the grounds of the institution, six thousand dollars.

To provide for payments due and unpaid on July first, eighteen hundred and seventy-two, on the purchase by the institution of the estate known as Kendall Green, seventy thousand dollars: *Provided*, That before the expenditure of any part of this appropriation, by proper deeds of conveyance, to be approved by the Attorney General of the United States, all the real estate now owned by the said Columbia Institution for the Deaf and Dumb shall be vested in the United States, as trustee, for the sole use and purpose provided in the act entitled "An act to incorporate the Columbia Institution for the Instruction of the Deaf and Dumb and the Blind," approved February sixteenth, eighteen hundred and fifty-seven, and the several acts amendatory thereof: *Provided*, That whenever Congress shall so determine, any part of said estate may be sold, and so much of the proceeds thereof as shall be needful for the purpose shall be applied to reimburse the United States for the expenditure herein provided.

* * * * *

Act of March 3, 1873 (17 Stat. L., 518).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-four, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including salaries and incidental expenses, the maintenance of the beneficiaries of the United States, and five hundred dollars for books and illustrative apparatus, forty-eight thousand dollars.

* * * * *

Act of June 22, 1874 (18 Stat. L., 143).

AN ACT Making appropriations to supply deficiencies in appropriations for the service of the Government for the fiscal years ending June thirtieth, eighteen hundred and seventy-three and eighteen hundred and seventy-four, and for other purposes.

* * * * *

For the Columbia Institution for the Deaf and Dumb in the District of Columbia, to enable the trustees of the institution to pay the amount yet due on the purchase of the estate known as Kendall Green, ten thousand six hundred and ninety-seven dollars and forty-six cents, to be expended under the direction of the Secretary of the Interior.

* * * * *

Act of June 23, 1874 (18 Stat. L., 215).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-five, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including salaries and incidental expenses, the maintenance of the beneficiaries of the United States, and five hundred dollars for books and illustrative apparatus, forty-eight thousand dollars.

For continuing the work on the erection and fitting up the buildings of the institution, in accordance with plans heretofore submitted to Congress, twenty-nine thousand dollars.

* * * * *

Act of March 3, 1875 (18 Stat. L., 386).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-six, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including salaries and incidental expenses, the maintenance of the beneficiaries of the United States, and five hundred dollars for books and illustrative apparatus, forty-eight thousand dollars.

For continuing the work on the erection, furnishing, and fitting up the buildings of the institution, in accordance with the plans submitted to Congress, forty thousand dollars.

* * * * *

Act of July 31, 1876 (19 Stat. L., 108).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-seven, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including salaries and incidental expenses, the maintenance of the beneficiaries of the United States, and five hundred dollars for books and illustrative apparatus, forty-eight thousand dollars.

For continuing the work on the erection, furnishing, and fitting up the buildings of the institution, in accordance with plans heretofore submitted, and for repairs on buildings already completed, forty thousand dollars.

* * * * *

Act of March 3, 1877 (19 Stat. L., 347).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-eight, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including salaries and incidental expenses, the maintenance of the beneficiaries of the United States, and five hundred dollars for books and illustrative apparatus, forty-eight thousand dollars. And the accounting officers of the Treasury are hereby authorized in the settlement of the accounts of the disbursing agent for said institution to give credit for voucher numbered five, in the first quarter of eighteen hundred and seventy-six, and for vouchers numbered forty-one and fifty-eight in second quarter of the same year, said vouchers being receipts for moneys paid for fuel for the use of said institution, if the said accounting officers shall find that said vouchers were for expenditures made for the benefit of said institution.

For the completion of the work on the erection, furnishing, and fitting up the buildings of the institution in accordance with plans heretofore submitted and for repairs on buildings already completed, sixty-nine thousand five hundred and twenty-four dollars and sixty-two cents.

* * * * *

Act of December 15, 1877 (20 Stat. L., 12).

AN ACT To provide for deficiencies in the appropriations for the service of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-eight, and for prior years, and for other purposes.

* * * * *

For fitting up and furnishing the new buildings of the Columbia Institution for the Deaf and Dumb, being a deficiency for the fiscal

year eighteen hundred and seventy-eight, two thousand five hundred dollars.

* * * * *

Act of June 20, 1878 (20 Stat. L., 231).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-nine, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

Current expenses Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and five hundred dollars for books and illustrative apparatus, fifty-one thousand dollars.

For furniture and repairs of fences and walks, five thousand dollars, which shall be immediately available.

* * * * *

Act of March 3, 1879 (20 Stat. L., 395).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

Current expenses Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and five hundred dollars for books and illustrative apparatus, fifty thousand dollars.

* * * * *

Act of June 16, 1880 (21 Stat. L., 275).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-one, and for other purposes.

* * * * *

Current expenses Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and five hundred dollars for books and illustrative apparatus, and two thousand five hundred dollars for general repairs, fifty-three thousand five hundred dollars: *Provided*, That when any indigent applicant for admission to the institution belonging to the District of Columbia, and being of teachable age, is found, on examination by the president of the institution, to be of feeble mind

and hence incapable of receiving instruction among children of sound mind, the Secretary of the Interior may cause such person to be instructed in some institution for the education of feeble-minded children in Pennsylvania or some other State at a cost not greater for each pupil than is, or may be for the time being, paid by such State for similar instruction, and the sum necessary therefor is appropriated out of the sum above provided for current expenses of the institution.

For erection and fitting up of a gymnasium for the use of the students and pupils, five thousand dollars, and for the improvement and inclosure of the grounds of the institution, two thousand five hundred dollars; in all, seven thousand five hundred dollars.

* * * * *

Act of March 31, 1881 (21 Stat. L., 452).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-two, and for other purposes.

* * * * *

Current expenses Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and five hundred dollars for books and illustrative apparatus, and two thousand five hundred dollars for general repairs, fifty-three thousand five hundred dollars.

Buildings and grounds Columbia Institution for the Deaf and Dumb: For the completion and fitting up of the gymnasium, eight thousand two hundred and forty-two dollars and seven cents; for the erection of a farm barn, two thousand dollars; in all, ten thousand two hundred and forty-two dollars and seven cents.

* * * * *

Act of August 7, 1882 (22 Stat. L., 330).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-three, and for other purposes.

* * * * *

For current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and for books and illustrative apparatus, for general repairs and improvements, fifty-five thousand dollars: *Provided*, That no more than twenty-two thousand dollars of said sum shall be expended for salaries and wages.

For buildings and grounds of the Columbia Institution for the Deaf and Dumb: For the completion of the farm barn, two thousand dollars, and for the inclosure and improvement of the grounds of the institution, one thousand five hundred dollars.

* * * * *

Act of March 3, 1883 (22 Stat. L., 625-626).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, eighteen hundred and eighty-four, and for other purposes.

* * * * *

For current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and for books and illustrative apparatus, for general repairs and improvements, fifty-five thousand dollars: *Provided*, That no more than twenty-five thousand dollars of said sum shall be expended for salaries and wages: *Provided further*, Hereafter the report of said institution shall contain an itemized statement of all employees, the salaries or wages respectively, each of them, and also of all other expenses of said institution.

For the improvement and inclosure of the grounds and repairs of buildings, three thousand dollars.

* * * * *

Act of July 7, 1884 (23 Stat. L., 213-214).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-five, and for other purposes.

* * * * *

For current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, for general repairs and improvements, fifty-five thousand dollars: *Provided*, That no more than twenty-five thousand dollars of said sum shall be expended for salaries and wages.

For improvement and inclosure of the grounds and repairs of buildings, three thousand dollars.

* * * * *

Act of July 7, 1884 (23 Stat. L., 255).

AN ACT Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, eighteen hundred and eighty-four, and for prior years, and for those certified as due by the accounting officers of the Treasury in accordance with section four of the act of June fourteenth, eighteen hundred and seventy-eight, heretofore paid from permanent appropriations, and for other purposes.

* * * * *

For current expenses, Columbia Institution for the Deaf and Dumb, eighteen hundred and eighty-one, and prior years, thirty-nine cents.

* * * * *

Act of March 3, 1885 (23 Stat. L., 501).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-six, and for other purposes.

* * * * *

For current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and inci-

dental expenses, and for books and illustrative apparatus, for general repairs and improvements, fifty-five thousand dollars: *Provided*, That no more than twenty-five thousand dollars of said sum shall be expended for salaries and wages.

For the extension of the buildings of the institution for the purpose of providing additional schoolroom accommodation, seventeen thousand dollars.

* * * * *

Act of August 4, 1886 (24 Stat. L., 241-242).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-seven, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and for books and illustrative apparatus, for general repairs and improvements, fifty-two thousand five hundred dollars: *Provided*, That no more than twenty-five thousand dollars of said sum shall be expended for salaries and wages.

To enable the Secretary of the Interior to provide for the education of feeble-minded children belonging to the District of Columbia, as provided for in the act approved June sixteenth, eighteen hundred and eighty, two thousand five hundred dollars.

For the extension of the buildings of the institution for the purpose of providing additional schoolroom accommodation, and also room for the instruction of the pupils in industrial labor, and for furnishing and fitting up said additional building, eight thousand dollars.

* * * * *

Act of March 3, 1887 (24 Stat. L., 528).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-eight, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and for books and illustrative apparatus, for general repairs and improvements, fifty-two thousand five hundred dollars: *Provided*, That no more than twenty-five thousand dollars of said sum shall be expended for salaries and wages.

To enable the Secretary of the Interior to provide for the education of feeble-minded children belonging to the District of Columbia, as provided for in the act approved June sixteenth, eighteen hundred and eighty, two thousand five hundred dollars.

* * * * *

Act of February 1, 1888 (25 Stat. L., 13).

AN ACT Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, eighteen hundred and eighty-seven, and for prior years, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including salaries and incidental expenses, and for books and illustrative apparatus, for general repairs and improvements, two thousand five hundred dollars.

Act of March 30, 1888 (25 Stat. L., 54).

AN ACT To provide for certain of the most urgent deficiencies in the appropriations for the service of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-eight, and for other purposes.

* * * * *

Current expenses, Columbia Institution for the Deaf and Dumb: For current expenses for the year ending June thirtieth, eighteen hundred and eighty-eight, in addition to the amount already appropriated, two thousand five hundred dollars.

* * * * *

Act of October 2, 1888 (25 Stat. L., 527-528).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred eighty-nine, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and for books and illustrative apparatus, and for general repairs and improvements, fifty-two thousand five hundred dollars: *Provided*, That no more than twenty-five thousand dollars of said sum shall be expended for salaries and wages.

To enable the Secretary of the Interior to provide for the education of feeble-minded children belonging to the District of Columbia, as provided for in the act approved June sixteenth, eighteen hundred and eighty, two thousand five hundred dollars.

* * * * *

Act of March 2, 1889 (25 Stat. L., 921).

AN ACT Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, eighteen hundred and eighty-nine, and for prior years, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, two thousand five hundred dollars.

Act of March 2, 1889 (25 Stat. L., 961-962).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, and for books and illustrative apparatus, and for general repairs and improvements, fifty-five thousand dollars: *Provided*, That of the above sum no more shall be expended for salaries and wages in this institution during the fiscal year eighteen hundred and ninety than shall, with the payments from other sources, make a total for such salaries and wages for said year of twenty-eight thousand dollars in all: *Provided further*, That one-half of all expenses attending the instruction of deaf and dumb persons admitted to said institution from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes shall be paid from the revenues of the District of Columbia and one-half out of the Treasury of the United States, and hereafter estimates for such expenses shall each year be submitted in the regular estimates for the expenses of the government of the District of Columbia: *And provided further*, That deaf-mutes, not exceeding sixty in number, admitted to this institution from the several States and Territories as provided in section forty-eight hundred and sixty-five of the Revised Statutes shall only have the expenses of their instruction in the collegiate department, exclusive of support, paid from appropriations made for the support of the institution.

To enable the Secretary of the Interior to provide for the education of feeble-minded children belonging to the District of Columbia as provided for in the act approved June sixteenth, eighteen hundred and eighty, two thousand five hundred dollars, one-half of this sum to be paid out of the revenues of the District of Columbia and one-half out of the Treasury of the United States.

* * * * *

Act of August 6, 1890 (26 Stat. L., 308).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, eighteen hundred and ninety-one, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars.

* * * * *

Act of August 30, 1890 (26 Stat. L., 392-393).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-one, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and inci-

dental expenses, and for books and illustrative apparatus and for general repairs and improvements, forty-seven thousand five hundred dollars: *Provided*, That deaf-mutes, not exceeding sixty in number, admitted to this institution from the several States and Territories under section forty-eight hundred and sixty-five of the Revised Statutes shall have the expenses of their instruction in the collegiate department paid from this appropriation, together with so much of the expense of their support when indigent and while in the institution as may be authorized by the board of trustees with the approval of the Secretary of the Interior; and hereafter there shall not be admitted to said institution under section forty-eight hundred and sixty-five of the Revised Statutes, nor shall there be maintained after such admission, at any one time from any State or Territory exceeding three deaf-mutes while there are applications pending from deaf-mutes, citizens of States or Territories having less than three pupils in said institution: *Provided further*, That hereafter there shall be included in the annual Book of Estimates a statement showing the number of persons employed each year in this institution and the compensation paid to each.

To enable the Secretary of the Interior to provide for the education of feeble-minded children belonging to the District of Columbia as provided for in the act approved June sixteenth, eighteen hundred and eighty, three thousand four hundred dollars. One-half of this sum shall be paid out of the revenues of the District of Columbia and one-half out of the Treasury of the United States, and hereafter the estimates for this expense shall each year be submitted in the annual estimates for the expenses of the government of the District of Columbia.

* * * * *

Act of September 30, 1890 (26 Stat. L., 522).

AN ACT Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, eighteen hundred and ninety, and for prior years, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For salaries and wages, in addition to the amount already allowed, two thousand five hundred and thirty-one dollars and ninety-nine cents.

* * * * *

Act of March 3, 1891 (26 Stat. L., 973).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-two, and for other purposes.

* * * * *

Current expenses of the Columbia institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty thousand five hundred dollars, three

thousand dollars of which to be expended in the employment of instructors of articulation.

* * * * *

Act of March 3, 1891 (26 Stat. L., 1077).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, eighteen hundred and ninety-two, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia, under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary; and all disbursements for this object, beginning with the current fiscal year, shall be accounted for through the Department of the Interior.

To enable the Secretary of the Interior to provide for the education of feeble-minded children belonging to the District of Columbia, as provided for in the act approved June sixteenth, eighteen hundred and eighty, three thousand four hundred dollars, or so much thereof as may be necessary.

* * * * *

Act of July 14, 1892 (27 Stat. L., 164).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, eighteen hundred and ninety-three, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia, under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary; and all disbursements for this object shall be accounted for through the Department of the Interior.

* * * * *

Act of August 5, 1892 (27 Stat. L., 372).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-three, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty thousand five hundred dollars, three thousand dollars of which to be expended in the employment of instructors of articulation.

For buildings and grounds as follows: For inclosure, care, and improvement of grounds, and for repairs of buildings, including repairs of heating apparatus, plumbing, and sewerage, two thousand dollars.

* * * * *

Act of March 3, 1893 (27 Stat. L., 551).

AN ACT Making appropriations for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, eighteen hundred and ninety-four, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary; and all disbursements for this object shall be accounted for through the Department of the Interior.

* * * * *

Act of March 3, 1893 (27 Stat. L., 595).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-four, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-two thousand five hundred dollars, three thousand dollars of which to be expended in the employment of instructors of articulation.

For completion of inclosure of grounds, one thousand dollars.

* * * * *

Act of August 7, 1894 (28 Stat. L., 259).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, eighteen hundred and ninety-five, and for other purposes.

* * * * *

For the instruction of the deaf and dumb: For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary; and all disbursements for this object shall be accounted for through the Department of the Interior.

* * * * *

Act of August 18, 1894 (28 Stat. L., 399).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-five, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and in-

cidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-two thousand five hundred dollars; for special repairs to the buildings and to complete the inclosure of the grounds, one thousand dollars.

* * * * *

Act of March 2, 1895 (28 Stat. L., 761).

AN ACT Making appropriations to provide for expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, eighteen hundred and ninety-six, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia, under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary; and all disbursements for this object shall be accounted for through the Department of the Interior.

* * * * *

Act of March 3, 1897 (28 Stat. L., 941).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-six, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-two thousand five hundred dollars; for special repairs to the buildings and for the improvement of the grounds, one thousand dollars; for additional building, complete, thirty thousand dollars.

* * * * *

Act of June 11, 1896 (29 Stat. L., 409).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, eighteen hundred and ninety-seven, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia, under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary; and all disbursements for this object shall be accounted for through the Department of the Interior.

* * * * *

Act of June 11, 1896 (29 Stat. L., 437).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-seven, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-four thousand five hundred dollars.

For repairs to the buildings of the institution and for the furnishing of the new buildings provided for by act approved March second, eighteen hundred and ninety-five, three thousand dollars.

* * * * *

Act of March 3, 1897 (29 Stat. L., 681).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, eighteen hundred and ninety-eight, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia, under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or as much thereof as may be necessary; and all disbursements for this object shall be accounted for through the Department of the Interior.

* * * * *

Act of June 4, 1897 (30 Stat. L., 38).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-eight, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-four thousand five hundred dollars.

For repairs to the buildings of the institution and to provide for increased water supply and protection against fire, three thousand dollars.

* * * * *

Act of July 19, 1897 (30 Stat. L., 127).

AN ACT Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, eighteen hundred and ninety-seven, and for prior years, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For repair of damages to buildings occasioned by the hurricane of September, eighteen hundred and ninety-six, being for the fiscal year eighteen hundred and ninety-seven, seven hundred and sixty-five dollars.

* * * * *

Act of June 30, 1898 (30 Stat. L., 540).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, eighteen hundred and ninety-nine, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary; and all disbursements for this object shall be accounted for through the Department of the Interior.

* * * * *

Act of July 1, 1898 (30 Stat. L., 624).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-nine, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-four thousand five hundred dollars: *Provided*, That directors appointed under the provisions of section forty-eight hundred and sixty-three of the Revised Statutes of the United States shall remain in office until the appointment and acceptance of office of their successors; and the directors of the institution shall have control of the disbursement of all moneys appropriated by Congress for the benefit of said institution, accounts for which shall be settled and adjusted at the Treasury Department as required by the provisions of section two hundred and thirty-six of the Revised Statutes.

For repairs to the buildings of the institution, including plumbing and steam-heating apparatus, and for repairs to pavements within the grounds, three thousand dollars.

* * * * *

Act of March 3, 1899 (30 Stat. L., 1061).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary.

Act of March 3, 1899 (30 Stat. L., 1101).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-four thousand five hundred dollars.

For repairs to the buildings of the institution, including plumbing and steam-heating apparatus, and for repairs to pavements within the grounds, three thousand dollars.

Hereafter one half of the indefinite appropriation to pay for the instruction of the indigent blind children of the District of Columbia, formerly instructed in the Columbia Institution for the Instruction of the Deaf, Dumb, and Blind, shall be paid out of the revenues of the District of Columbia and the other half out of the Treasury of the United States.

* * * * *

Act of June 6, 1900 (31 Stat. L., 575).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and one, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary.

* * * * *

Act of June 6, 1900 (31 Stat. L., 620).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and one, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-four thousand five hundred dollars: *Provided*, That the number of the beneficiaries in said institution, authorized by the act of August thirtieth, eighteen hundred and ninety, to be received from the several States and Territories is hereby increased from sixty to one hundred. For repairs to the buildings of the institution, including plumbing and steam-heating apparatus, and for repairs to pavements within the grounds, three thousand dollars.

* * * * *

Act of March 1, 1901 (31 Stat. L., 844).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and two, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary: *Provided*, That hereafter all deaf-mutes of teachable age, of good mental capacity, and properly belonging to the District of Columbia shall be received and instructed in said institution, their admission thereto being subject to the approval of the superintendent of public schools of the District of Columbia. And said institution shall not be regarded nor classified as an institution of charity.

* * * * *

Act of March 3, 1901 (31 Stat. L., 1164).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and two, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-six thousand five hundred dollars.

For repairs to the buildings of the institution, including plumbing and steam-heating apparatus, and for repairs to pavements within the grounds, three thousand dollars.

* * * * *

Act of February 14, 1902 (32 Stat. L., 19).

AN ACT Making appropriations to supply urgent deficiencies in the appropriations for the fiscal year ending June thirtieth, nineteen hundred and two, and for prior years, and for other purposes.

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For support of the institution, in addition to the amount appropriated for this object in the sundry civil appropriation act approved March third, nineteen hundred and one, said additional expense having been made necessary by the increase in the number of beneficiaries authorized by act of Congress approved June sixth, nineteen hundred, two thousand dollars.

* * * * *

Act of June 28, 1902 (32 Stat. L., 457).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and three, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-eight thousand five hundred dollars.

For repairs to the buildings of the institution, including plumbing and steam-heating apparatus, and for repairs to pavements within the grounds, three thousand dollars.

To provide suitable protection against disaster by fire to the buildings of the institution, three thousand two hundred and ninety-one dollars, to be immediately available.

* * * * *

Act of July 1, 1902 (32 Stat. L., 606).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and three, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary.

* * * * *

Act of March 3, 1903 (32 Stat. L., 971).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and four, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF.

Act of March 3, 1903 (32 Stat. L., 1055).

AN ACT Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, nineteen hundred and three, and for prior years, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, one thousand five hundred dollars.

* * * * *

Act of March 3, 1903 (32 Stat. L., 1120-1121).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and four, and for other purposes.

* * * * *

Current expenses of the Columbia Institution for the Deaf and Dumb: For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, fifty-eight thousand five hundred dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, three thousand dollars.

For additions to the buildings of the institution to provide additional accommodations for students and officers, for schoolrooms, and to enlarge the laundry, thirty thousand dollars.

* * * * *

Act of February 18, 1904 (33 Stat. L., 31).

AN ACT Making appropriations to supply urgent deficiencies in the appropriations for the year ending June thirtieth, nineteen hundred and four, and for prior years, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For the support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, one thousand five hundred dollars.

* * * * *

Act of April 27, 1904 (33 Stat. L., 380).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and five, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from

the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, ten thousand five hundred dollars, or so much thereof as may be necessary.

* * * * *

Act of April 28, 1904 (33 Stat. L., 488).

AN ACT Making appropriations for sundry civil expenses of the Government for the year ending June thirtieth, nineteen hundred and five, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF AND DUMB.

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, sixty thousand dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, three thousand dollars.

* * * * *

Act of March 3, 1905 (33 Stat. L., 901).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and six, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under sections forty-eight hundred and sixty-four of the Revised Statutes, and as provided for in the act approved March first, nineteen hundred and one, and this provision shall apply to appropriations made for the same object for the fiscal years nineteen hundred and four and nineteen hundred and five, ten thousand five hundred dollars, or so much thereof as may be necessary. And the directors of said institution are hereby authorized to provide for the education of colored deaf-mute children properly belonging to the District of Columbia in the Maryland School for Colored Deaf-Mutes, or some other suitable school, at a cost not exceeding the per capita expense of educating the State pupils in such school.

* * * * *

Act of March 3, 1905 (33 Stat. L., 1189).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and six, and for other purposes.

* * * * *

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, sixty thousand dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, three thousand dollars.

For additions to the buildings of the institution, to furnish additional accommodations for pupils, and to provide for the heating of the buildings from a central plant, and for lighting the buildings by electricity, thirty thousand dollars.

* * * * *

Act of March 3, 1905 (33 Stat. L., 1235).

AN ACT Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, nineteen hundred and five, and for prior years, and for other purposes.

* * * * *

For the support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, for the fiscal year nineteen hundred and five, two thousand five hundred dollars.

* * * * *

Act of February 27, 1906 (34 Stat. L., 37).

AN ACT Making appropriations to supply urgent deficiencies in the appropriations for the fiscal year ending June thirtieth, nineteen hundred and six, and for prior years, and for other purposes.

* * * * *

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, two thousand five hundred dollars.

* * * * *

Act of June 27, 1906 (34 Stat. L., 503).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and seven, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia, under section forty-eight hundred and sixty-four of the Revised Statutes, and as provided for in the act approved March first, nineteen hundred and one, ten thousand five hundred dollars, or so much thereof as may be necessary. And the directors of said institution are hereby authorized to provide for the education of colored deaf-mute children properly belonging to the District of Columbia, in the Maryland School for Colored Deaf Mutes or some other suitable school, at a cost not exceeding the per capita expense of educating the State pupils in such school.

* * * * *

Act of June 30, 1906 (34 Stat. L., 731).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and seven, and for other purposes.

* * * * *

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, sixty-two thousand five hundred dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, five thousand dollars.

* * * * *

Act of March 2, 1907 (34 Stat. L., 1142).

AN ACT Making appropriations to provide for the expenses of the Government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and eight, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, and as provided for in the act approved March first, nineteen hundred and one, ten thousand five hundred dollars, or so much thereof as may be necessary.

* * * * *

Act of March 4, 1907 (34 Stat. L., 1338).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and eight, and for other purposes.

* * * * *

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, sixty-two thousand five hundred dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, five thousand dollars.

* * * * *

Act of May 26, 1908 (35 Stat. L., 295).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and nine, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and

sixty-four of the Revised Statutes, and as provided for in the act approved March first, nineteen hundred and one, and under a contract to be entered into with the said institution by the Commissioners of the District of Columbia, ten thousand five hundred dollars, or so much thereof as may be necessary.

* * * * *

Act of May 27, 1908 (35 Stat. L., 352).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and nine, and for other purposes.

* * * * *

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, sixty-two thousand five hundred dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, five thousand dollars.

For the proper inclosure of the grounds of the institution and the grading made necessary by the opening of West Virginia Avenue on the eastern boundary of the grounds, five thousand dollars.

* * * * *

Act of March 3, 1909 (35 Stat. L., 710).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and ten, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia, under section forty-eight hundred and sixty-four of the Revised Statutes, and as provided for in the act approved March first, nineteen hundred and one, and under a contract to be entered into with the said institution by the Commissioners of the District of Columbia, ten thousand five hundred dollars, or so much thereof as may be necessary.

* * * * *

Act of March 4, 1909 (35 Stat. L., 991).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and ten, and for other purposes.

* * * * *

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, sixty-five thousand dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, five thousand dollars.

* * * * *

Act of May 18, 1910 (36 Stat. L., 398).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and eleven, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia, under section forty-eight hundred and sixty-four of the Revised Statutes, and as provided for in the act approved March first, nineteen hundred and one, and under a contract to be entered into with the said institution by the Commissioners of the District of Columbia, ten thousand dollars, or so much thereof as may be necessary.

* * * * *

Act of June 25, 1910 (36 Stat. L., 746).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and eleven, and for other purposes.

* * * * *

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, sixty-seven thousand dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, five thousand dollars.

* * * * *

Act of June 25, 1910 (36 Stat. L., 796).

AN ACT Making appropriations to supply deficiencies in appropriations for the fiscal year nineteen hundred and ten and for prior years, and for other purposes.

* * * * *

To provide for the rebuilding of the west dormitory, which has lately been partially destroyed by fire, twenty-five thousand dollars, or so much thereof as may be necessary, to continue available during the fiscal year nineteen hundred and eleven.

* * * * *

Act of March 2, 1911 (36 Stat. L., 989).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and twelve, and for other purposes.

* * * * *

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf and Dumb from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, and as provided for in the act approved

March first, nineteen hundred and one, and under a contract to be entered into with the said institution by the Commissioners of the District of Columbia, eleven thousand dollars, or so much thereof as may be necessary.

* * * * *

Act of March 4, 1911 (36 Stat. L., 1309).

AN ACT Making appropriations to supply deficiencies in appropriations for the fiscal year nineteen hundred and eleven and for prior years, and for other purposes.

* * * * *

The expenditures incurred during the current fiscal year for furnishing and equipping the western dormitory of the Columbia Institution for the Deaf and Dumb, partially destroyed by fire February sixth, nineteen hundred and ten, and for resurfacing asphalt walks and driveways adjacent thereto, may be paid from the appropriation available for the current year for rebuilding of the western dormitory.

* * * * *

Act of March 4, 1911 (36 Stat. L., 1422).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and twelve, and for other purposes.

* * * * *

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, sixty-six thousand five hundred dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, five thousand dollars.

For the building of a new dairy barn to accommodate thirty cows; for the construction of a milk house and silo; for the repair of present barns and stable; and for adding to and altering the greenhouse, twelve thousand five hundred dollars.

From and after the passage of this act the Columbia Institution for the Deaf and Dumb shall be known and designated as the Columbia Institution for the Deaf.

* * * * *

Act of June 26, 1912 (Public, No. 201, 62d Cong., 1st sess.).

AN ACT Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and thirteen, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF.

For expenses attending the instruction of deaf and dumb persons admitted to the Columbia Institution for the Deaf from the District of Columbia under section forty-eight hundred and sixty-four of the Revised Statutes, and as provided for in the act approved March

first, nineteen hundred and one, and under a contract to be entered into with the said institution by the Commissioners of the District of Columbia, eleven thousand five hundred and fifty dollars, or so much thereof as may be necessary.

* * * * *

Act of August 24, 1912 (Public, No. 302, 62d Cong., 1st sess.).

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and thirteen, and for other purposes.

* * * * *

COLUMBIA INSTITUTION FOR THE DEAF.

For support of the institution, including salaries and incidental expenses, for books and illustrative apparatus, and for general repairs and improvements, sixty-six thousand five hundred dollars.

For repairs to the buildings of the institution, including plumbing and steam fitting, and for repairs to pavements within the grounds, five thousand dollars.

* * * * *

64213°—INT 1912—VOL 1—37

REPORT OF THE FREEDMEN'S HOSPITAL.

579

REPORT OF THE FREEDMEN'S HOSPITAL.

STAFF.

W. A. Warfield, M. D., *Surgeon in Chief.* Walter Van Swearingen, M. D., *Pathologist.*
S. L. Carson, M. D., *Assistant Surgeon.*
C. A. Brooks, M. D., *Resident Physician.* Geo. W. Davis, M. D., *Anæsthetist.*

NURSES.

Laura R. MacHale, superintendent; Emma M. Irwin, assistant superintendent;
Martha E. Cabaniss, night supervisor; Susan C. Barks, head nurse; Bertha J. Thomas, head nurse.

CLERK AND ASSISTANTS.

F. D. Henry, Arsine E. Jones (stenographer), W. E. Cobb.

INTERNES.

C. A. Allen. F. V. McDonald.
C. A. A. Gordon. C. C. Stewart.
W. F. Holmes. J. W. V. Cordice.
J. H. Roberts. A. G. Purvis.
G. A. Jackson. J. W. Ross.
Wm. E. Davis, *Pharmacist.*
Walter S. Roholt, *Assistant Pharmacist.*

ADVISORY VISITING STAFF.

Edward A. Balloch, M. D. Wm. L. Robins, M. D.
Edward D. Williston, M. D. Jas. J. Richardson, M. D.
John R. Francis, M. D. J. B. Nichols, M. D.
Wm. F. Sowers, M. D.

VISITING STAFF.

INDOOR.

Medical.

Henry P. Parker, M. D. Robert W. Brown, M. D.
Caryl Burbank, M. D. J. B. Nichols, M. D.
Thomas Martin, M. D. E. H. Reede, M. D.
Lewis Ecker, M. D.

Surgical.

E. A. Balloch, M. D. Wm. A. Jack, M. D.
Wm. F. Sowers, M. D. H. H. Kerr, M. D.
A. M. Curtis, M. D.

Gynecological.

W. A. Warfield, M. D. Howard Hume, M. D.
Wm. C. McNeill, M. D. J. E. H. Taylor, M. D.
H. W. Lawson, M. D.

Obstetrical.

John R. Francis, M. D. Edward D. Williston, M. D.
Geo. N. Perry, M. D.

Ophthalmological.

Robert S. Lamb, M. D. Assistants: Martha B. Lyon, M. D.; Elizabeth Sohon, M. D.

Otology and Rhinology.

J. J. Richardson, M. D. Assistants: Reginald R. Walker, M. D.; Hamilton S. Martin, M. D.

Neurology.

Wm. L. Robins, M. D. Assistant: E. C. A. Wilson, M. D.

Genito-Urinary.

H. A. Fowler, M. D. Assistants: Milton A. Francis, M. D.; R. Arthur Hooe, M. D.

Orthopedics.

Wm. G. Erving, M. D. John Dunlop, M. D.

Pediatrics.

John W. Mitchell, M. D.

Wm. J. French, M. D.
Milton Hahn, M. D.

OUTDOOR.

Medical.

E. H. Reede, M. D.
U. J. Daniels, M. D.
R. A. Logan, M. D.
C. A. Tignor, M. D.

S. S. Thompson, M. D.
Lee A. Gill, M. D.
P. McD. Milliard, M. D.
Chas. A. Allen, M. D.

Minor Surgery.

Wm. A. Jack, M. D.
C. W. Childs, M. D.

S. L. Carson, M. D.
Wm. J. Howard, M. D.

Ophthalmological.

R. S. Lamb, M. D. Assistants: Martha B. Lyon, M. D.; James C. Dowling, M. D.; Elizabeth Schon, M. D.; E. C. A. Wilson, M. D.

Otology and Rhinology.

Jas. J. Richardson, M. D. Assistants: Reginald Walker, M. D.; Hamilton S. Martin, M. D.; Guy S. Saffold, M. D.

Neurology.

Wm. L. Robins, M. D. Assistant: E. C. A. Wilson, M. D.

Genito-Urinary.

H. A. Fowler, M. D. Assistants: Milton A. Francis, M. D.; Wm. F. Hemler, M. D.; R. Arthur Hooe, M. D.

Gynecology.

Wm. C. McNeill, M. D. Assistant: Chas. H. Marshall, M. D.

Orthopedics.

Wm. G. Erving, M. D.

John Dunlop, M. D.
Assistant: Chas. A. Allen, M. D.

Pediatrics.

John W. Mitchell, M. D. Assistant: J. Francis Johnson, M. D.

Dermatology.

H. H. Hazen, M. D.

Tuberculosis.

P. McD. Milliard, M. D.

REPORT OF THE FREEDMEN'S HOSPITAL.

WASHINGTON, D. C., *August 19, 1912.*

SIR: I have the honor to submit the annual report of the Freedmen's Hospital, covering the work done during the fiscal year ended June 30, 1912.

The general work of the year is summarized in the statistical tables presented herewith, and by a comparison with the year immediately preceding an increase in the volume of work is shown in all branches of the hospital, with results, in the main, satisfactory. The public service, however, could be improved and conducted more scientifically if the needs hereinafter noted, were provided. It may be asserted that the results already had more than justify the added expense incident to further improvement.

The lack of a sufficient number of employees causes all to labor with a never-ending rush, which is not always conducive to the best results. Salaries, generally, should be increased, so as not only to attract efficient employees to the service, but to offer a proper inducement for them to remain when once employed and to reward the loyal and faithful ones now in the service.

PATIENTS.

In the care and treatment of the patients every possible effort has been put forth in the way of supplying their needs to the full extent of the funds at the disposal of the hospital, and no suggestion has been overlooked that would tend to improve the usefulness of the same.

There were received into the hospital during the year 3,093 patients, and 292 births occurred. These, with 176 remaining from the preceding year, make a total of 3,561 indoor patients receiving the benefits of the hospital, an increase of 661 over the last fiscal year. Of those under care, 1,853 were chargeable to the District of Columbia and 1,708 to the General Government.

There were discharged from the hospital during the year 3,056 patients, of whom 1,350 had recovered, 1,280 improved, 188 unimproved, 7 not treated, and 231 died, leaving 213 in the hospital at the close of the year, 89 of whom were residents of the District of Columbia and 124 were from the States.

The percentage of deaths from all causes, including moribund cases and premature births, was 6.3+, 2 per cent less than last year. There had been a noticeable decrease in the moribund cases applying for admission. This, with a greater number of people than heretofore availing themselves of the benefits of early hospital treatment

for their ailments instead of the hospital as the last resort, explains to some extent the low mortality.

One thousand nine hundred and twenty-two surgical operations were performed, or 155 more than the preceding year, with the following results: Recovered, 1,065; improved, 789; unimproved, 8; died, 51.

Patients admitted each year for the past 38 years.

Year ending June 30:		Year ending June 30:		Year ending June 30:	
1875.....	190	1888.....	1,997	1901.....	2,414
1876.....	319	1889.....	2,074	1902.....	2,408
1877.....	500	1890.....	2,392	1903.....	2,677
1878.....	519	1891.....	2,373	1904.....	2,907
1879.....	642	1892.....	2,331	1905.....	2,918
1880.....	819	1893.....	2,422	1906.....	2,207
1881.....	892	1894.....	2,801	1907.....	2,366
1882.....	1,102	1895.....	2,476	1908.....	2,669
1883.....	1,373	1896.....	2,596	1909.....	2,590
1884.....	1,509	1897.....	2,815	1910.....	2,740
1885.....	1,794	1898.....	2,355	1911.....	2,900
1886.....	1,923	1899.....	2,374	1912.....	3,385
1887.....	2,017	1900.....	2,427		

The following tables set forth in classified detail the medical and surgical diseases of the indoor patients.

Medical and surgical diseases.

Disease.	Beginning July 1, 1911.	Admitted.					Discharged.					Total number of days in hospital.	Average number of days in hospital.	Remaining July 1, 1912.	
		Colored.		White.		Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.				Total.
		Male.	Female.	Male.	Female.										
<i>Abcesses, infections, and ulcers.</i>															
<i>Absscess:</i>															
Alveolar.....		1	1			2		2			2	28	14		
Axilla.....		1				1		1			1	13	13		
Buttock.....			1			1				1	1	76	76		
Chest wall.....		1	3			4		4			4	58	14.5		
Ischio-rectal.....		6	4	1		11	2	7			9	76	8.4	2	
Neck.....		1				1		1			1	1	1		
Parotid gland.....		1				1		1			1	7	7		
Peritonsillar.....		2	2			4		4			4	28	7		
Periurethral.....		5				5	1	3		1	5	111	22		
Retrocecal.....		2				2		1			1	57	57	1	
Retropharyngeal.....		1				1				1	1	3	3		
Submaxillary.....		1	1			2	1	1			2	29	14.5		
Submental.....			1			1		1			1	6	6		
Vulvo-vaginal.....			4			4	4				4	73	18.2		
<i>Infections:</i>															
Hand.....		5	3			8	1	6			7	98	14	1	
Frontal sinus.....		1				1								1	
Leg.....		3				3	1		1	1	3	54	18		
Lachrymal sac.....		1				1	1				1	15	15		
Neck.....		5	1			6	2	4			6	50	8.3		
Prepatellar bursa.....			2	1		3	1	2			3	43	14.3		
Thigh.....		4				4	1	3			4	156	39		
Toe.....		1				1		1			1	12	12		
<i>Ulcers:</i>															
Arm.....		1				1		1			1	55	55		
Foot.....		1				1		1			1	64	64		
Rectum.....			1			1		1			1	39	39		
Traumatic ulcer, leg.....				1		1		1			1	63	63		
Syphilitic ulcer, leg.....		1		1		2		2			2	214	107		
Varicose ulcer, leg.....		1	7	9	2	19	2	13			15	850	56.6		

Medical and surgical diseases—Continued.

Disease.	Beginning July 1, 1911.	Admitted.				Total.	Discharged.					Total.	Total number of days in hospital.	Average number of days in hospital.	Remaining July 1, 1912.	
		Colored.		White.			Recovered.	Improved.	Unimproved.	Not treated.	Died.					
		Male.	Female.	Male.	Female.											
<i>Bones and joints.</i>																
Ankylosis:																
Elbow joint.....		1				1	2			1		1	2	2		
Hip joint.....		1	1			2		2				2	88	48		
Knee joint.....	1					1		1				1	146	146		
Arthritis deformans.....				1		1		1				1	53	53		
Arthritis:																
Gonorrheal.....		9	6			15		14				14	409	29.2	1	
Tubercular:																
Ankle.....	1	4	4			9		8				8	563	70.3	1	
Elbow.....				1		1		1				1	49	49		
Hip.....	4	6	3			13		11	1			12	830	69		1
Knee.....		7	1			8		3	2			5	259	51.8	3	
Spine.....	1	7	1			9		4		2		6	1,025	170.9	3	
Contracted palmar fascia.....				1		1		1				1	2	2		
Deformities:																
Bunion.....		1				1	1					1	21	21		
Club foot.....		4		1		5	3					3	159	53		2
Fallen arches.....		1	1			2		2				2	42	21		
Genu valgum.....	1	2				3	1	2				3	173	57.6	4	
Scoliosis.....		1	1			2		2				2	15	7.5		
Dislocations:																
Astragalus.....			1			1		1				1	8	8		
Axis.....		1				1		1				1	15	15		
Femur.....		1	1			2		1				1	22	22	1	
Humerus.....		2	1			3	2		1			3	9	3		
Empyema frontal sinus.....	1					1		1				1	42	42		
Exostosis right tibia.....		1				1		1				1	5	5		
Fracture:																
Astragalus.....		1				1		1				1	7	7		
Clavicle.....		2				2		2				2	18	9		
Femur.....	1	2	3			6	1	2				3	219	73		3
Fibula.....		3		1		4		4				4	77	19.2		
Humerus.....		3	1			4		3	1			4	53	13.2		
Lower jaw.....		1	1			2	1	1				2	23	11.5		
Metatarsal.....		2				2	1	1				2	136	68		
Nasal bones.....		2				2		1	1			2	2	1		
Patella.....		1				1		1				1	29	29		
Radius.....		4		1		5	2	3				5	102	20.4		
Ribs.....		2	2	1		5	3	2								
Skull.....		8		1		9	2	5		1		8	92	11.5	1	
Tibia.....		9	2			11	2	8				10	266	26.6	1	
Tibia and fibula.....		1	2			3	1	1				2	108	54	1	
Ulna.....		1				1	1					1	49	49		
Hypertrophic arthritis.....				1		1		1				1	9	9		
Osteomyelitis:																
Tibia.....	1	1	4			6	3	2	1			6	355	59.1		
Toe.....	1					1	1					1	233	22.3		
Pyorrhea alveolaris.....		1				1		1				1	13	13		
Sprain:																
Ankle.....	1	3	1	1		6	1	5				6	114	19		
Back.....				1		1										1
Sacro-iliac joint.....		7	1			8	2	5	1			8	344	43		
Synovitis:																
Elbow.....			1			1		1				1	17	17		
Knee.....		2	1			3		3				3	78	26		
<i>Circulatory system.</i>																
Acute dilatation heart.....		5	1			6		4		2		6	116	19.3		
Aneurysm.....		1				1	1					1	41	41		
Angina pectoris.....		1				1		1				1	2	2		
Gangrene:																
Foot.....		6	3			9	2	3		4		9	304	33.6		
Hemorrhoids:																
External.....		1	2			3	2	1				3	35	11.6		
Internal.....		9	9			18	7	9	2			18	223	12.3		
Myocarditis.....		4				4		3		1		4	186	46.5		
Pericarditis.....	1	2				3	1	1		1		3	57	18		
Post operative hemorrhage.....		6	3			9	6	3				9	13	1.4		

Medical and surgical diseases—Continued.

Disease.	Beginning July 1, 1911.	Admitted.					Discharged.						Total number of days in hospital.	Average number of days in hospital.	Remaining July 1, 1912.	
		Colored.		White.		Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.				
		Male.	Female.	Male.	Female.											
<i>Circulatory system—Con.</i>																
Sclerosis.....		12	2			14		12				12	317	26.4	2	
Thrombo-phlebitis.....	2					2		2				2	40	20		
Valvular disease:																
Insufficiency—																
Aortic.....		11	1	1		13		11			1	12	248	20.6	1	
Mitral.....	1	33	18	1		53		33	5		11	491	947	39.7	4	
Stenosis:																
Aortic.....			2			2									2	
Mitral.....			1			1		1				1	314	314		
Varicose veins, leg.....		4	6			10	2	6	1			9	604	66.1	1	
<i>Constitutional diseases.</i>																
Anemia.....			4			4		2			1	3	39	13	1	
Diabetes mellitus.....	1	2	2			5	3	1			1	5	128	25.6		
Gout.....		1				1		1				1	16	16		
Marasmus.....		6	18			24	7	4			11	22	414	18.8	2	
Muscular atrophy.....		1				1		1				1	14	14		
Rachitis.....			1			1									1	
Senile debility.....		4	3	1		8		5			2	7	137	19.5	1	
<i>Digestive system.</i>																
Appendicitis:																
Acute.....	1	18	8			27	19	2	2		1	24	604	25.1	3	
Chronic.....		7	8			15	12	1	1			14	262	18.7	1	
Cardio spasm.....		1				1	1					1	2	2		
Constipation.....	2	3	4			9	5	4				9	126	14		
Dysentery.....		1				1					1	1	3	3		
Enteritis.....	3	19	13			35	3	16	2		13	34	563	16.5	1	
Fecal fistula.....		1	3			4	1	1			2	4	139	34.7		
Fissure in ano.....		2	6	1		9	7	2				9	140	15.5		
Fistula in ano.....	1	3	7			11	3	5				8	215	26	3	
Hernia:																
Direct inguinal.....		3				3	2	1				3	124	41.3		
Incision hernia.....			2			2	2					2	54	27		
Oblique inguinal.....	4	34	8	1		47	38	7				45	960	21.1	2	
Strangulated ingui- nal.....		3	3			6	4	2				6	102	17		
Umbilical.....			3	1		4	4					4	136	34		
Ventral.....	2		1			3						4	136	34		
Intestinal obstruction.....			3			3	1	1			1	3	68	22.6		
Pancreatitis, chronic.....			2			2		2				2	106	53		
Liver:																
Cholelithiasis.....			3			3	1				1	2	39	19.5		
Cirrhosis.....		2	1			3		2			1	3	143	47.6		
Cholecystitis.....		4	2			6	3	2			1	6	140	23.3		
Jaundice, catarrhal.....		2				2		2				2	49	24.5		
Pericollitis.....		1	1			2	1	1	1			2	77	38.5		
Post operative adhesions.....				1		1		1				1	20	20		
Prolapsed rectum.....		3	1			4	1	3				4	118	29.5		
Stomach:																
Carcinoma.....	1	7	3			11		4	3		3	10	179	17.9	1	
Dilatation.....		2	1			3		1			2	3	40	13.3		
Gastritis—																
Acute.....	1	22	23	1	1	48	10	34				44	432	9.8	4	
Chronic.....		7	4			11	1	10				11	266	23.2		
Pyloric stenosis.....			1			1		1				1	91	91		
Ulcer, gastric.....		2		1		3		2	1			3	55	18.3		
<i>Eye, ear, nose, and throat.</i>																
Eye:																
Acute glaucoma.....		1				1									1	
Astigmatism.....	1					1		1				1	47	47		
Cataract—																
Congenital.....		1				1		1				1	27	27		
Senile.....	3	5	2			10	3	6				9	339	37.6	1	
Chronic dacryocys- titis.....		1				1	1					1	12	12		
Conjunctivitis.....		4	3			7	2	3				5	97	19.4	2	

Medical and surgical diseases—Continued.

Disease.	Beginning July 1, 1911.	Admitted.				Discharged.						Total number of days in hospital.	Average number of days in hospital.	Remaining July 1, 1912.		
		Colored.		White.		Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.					
		Male.	Female.	Male.	Female.											
Eye, ear, nose, and throat—Contd.																
Eye—Continued.																
Corneal ulcer.....		1	1			2		2				2	82	41		
Detached retina.....		1				1		1				1	5	5		
Irido-cyclitis.....		4				4		3				3	209	69.6	1	
Iritis.....	1	10	3			14	1	12				13	602	43	1	
Keratitis.....	6	4	6			16	1	11				12	596	49.6	4	
Neuro-retinitis.....			1	1		2		2				2	56	28		
Optic atrophy.....	1	3				4		3	1			4	375	93.7		
Optic neuritis.....		1				1		1				1	3	3		
Panophthalmitis.....			1			1	1					1	74	74		
Pterygium.....			1			1		1				1	11	11		
Ptosis eyelids.....		1				1									1	
Retinitis.....		2				2		2				2	22	11		
Staphyloma.....			1			1									1	
Ear:																
Mastoiditis.....		1				1					1	1	28	28		
Otitis media.....		1	1			2		2				2	16	8		
Nose:																
Empyema antrum.....		3				3		3				3	46	15.3		
Epistaxis.....	1	1				1		1				1	1	1		
Hypertrophied turbi- nate.....	1		2			3	2	1				3	17	5.6		
Polyp.....			1			1	1					1	2	2		
Rhinitis—																
Acute.....	1					1		1				1	1	1		
Chronic.....	1					1		1				1	17	17		
Throat:																
Acute laryngitis.....		1				1		1				1	5	5		
Acute tonsillitis.....		12	7			19	6	13				19	201	10.5		
Adenoids.....		4	1	1		6	3	3				6	21	3.5		
Hypertrophied ton- sils and adenoids.....	1	33	34			68	39	28	1			68	278	4.1		
Pharynx—																
Acute pharyngitis.....		1				1		1				1	1	1		
Stomatitis.....		1				1		1				1	31	31		
Genito-urinary system.																
Acute retention.....		1				1		1				1	5	5		
Chancroids.....		24	5	1		30	6	20	1			27	563	20.8	3	
Cystitis.....		3	4			7	3	3				6	89	14.8	1	
Epididymitis.....		19		2		21	7	14				21	262	12.5		
Fistula:																
Urethral.....		3				3		2				2	47	23.5	1	
Vesico-vaginal.....			1			1		1				1	55	55		
Gonorrhoea.....	1	27	6	1		35	7	26	1			34	528	15.5	1	
Gumma testicle.....		2				2	2					2	26	13		
Hematocele.....		2				2	1					1	29	29	1	
Hydrocele.....		10				10	8	1				9	143	15.7	1	
Nephritis:																
Acute.....		6				6		3			3	6	157	26.1		
Chronic.....	7	34	33	2	1	77		34	6		29	69	1,808	26.2	8	
Pyonephrosis.....	2	1				3	1	1			1	3	135	45		
Oorchitis.....		1				1		1				1	12	12		
Paraphimosis.....		3				3		2				3	7	2.3		
Phimosis.....	1	22				23	11	11	1			23	546	23.7		
Prostatitis.....		9				9	1				1	9	296	32.9		
Ruptured bladder.....		1				1					1	1	2	2		
Ruptured kidney.....		1				1	1					1	18	18		
Stricture ureter.....			1			1		1				1	46	46		
Stricture urethra.....		22				22		19			1	21	414	19.7	1	
Undescended testicle.....	1					1	1					1	19	19		
Urethral caruncle.....			1			1	1					1	32	32		
Varicocele.....	1	1				2	2					2	60	30		
Vesical calculus.....		1				1	1					1	23	23		
Gynecological.																
Abortion.....	3		31			34	28	5				33	409	12.3	1	
Acute ante-flexion uterus.....			3			3	1	2				3	43	14.3		
Carcinoma cervix.....			18			18	2	6	8		2	18	479	26.6		

Medical and surgical diseases—Continued.

Disease.	Beginning July 1, 1911.	Admitted.					Discharged.						Total number of days in hospital.	Average number of days in hospital.	Remaining July 1, 1912.	
		Colored.		White.		Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.				
		Male.	Female.	Male.	Female.											
Gynecological—Contd.																
Dermoid cyst.....			2			2		1			1	2	26	13		
Ectopic gestation.....			11			11	10					11	306	228		
Endometritis.....	2		20			22	9	9	2			20	330	16.5	2	
Fibroid.....	12		78			90	69	3	4		6	82	2,338	28.5	8	
Fistula:																
Recto-vaginal.....			2			2	1	1				2	100	50		
Vesico-vaginal.....			1			1		1				1	135	135		
Hypertrophy cervix.....			1			1	1					1	24	24		
Infantile uterus.....			1			1		1				1	53	53		
Intraligamentous cyst.....			5			5	4				1	5	176	35.2		
Lacerated cervix.....			4			4	2	2				4	75	18.7		
Lacerated perineum.....	1		23			24	16	3	2			21	625	29.7	3	
Mastitis.....			1			1	1					1	16	16		
Menopause.....			1			1			1			1	2	2		
Menstrual disorders:																
Amenorrhea.....			1			1			1			1	1	1		
Dysmenorrhea.....			5			5	1	3				4	29	7.2	1	
Menorrhagia.....			7			7	4	2	1			7	66	9.4		
Ovaritis.....	2		32			34	22	3	2		1	28	780	28	6	
Post operative adhesions.....			6			6	2	4				6	239	39.8		
Procidentia uteri.....			4			4	3	1				4	86	21.5		
Pyosalpingitis.....	6		83			89	54	15	7		4	80	2,877	29.7	9	
Pyosalpingitis and aneurysm.....			1			1	1					1	202	202		
Pyosalpingitis and cystic ovaries.....																
Pyosalpingitis and fibroma uteri.....			12			12	11	1				12	370	30.8		
Retroflexion uterus.....			2			2	2					2	67	33.5		
Ruptured uterus, lacerated intestine.....			16			16	11	3				14	308	22	2	
Salpingitis.....			2			2	1				1	2	36	18		
Salpingitis and cystic ovaries.....			35			35	12	20	3			35	543	15.5		
Salpingitis and fibroma uteri.....	1		16			17	17					17	467	27.4		
Threatened abortion.....			1			1	1					1	22	22		
			6			6	3	2	1			6	50	8.3		
Infectious diseases.																
Broncho-pneumonia.....	1	2	4			7	1	4			2	7	284	40.5		
Diphtheria.....			1			1		1				1	10	10		
Erysipelas.....		1	1			2					2	2	22	11		
Malaria.....		10	2	1		13	5	8				13	208	16		
Measles.....		1	1			2		1	1			2	17	8.5		
Meningitis.....		2	2			4			1		3	4	7	1.7		
Parotitis.....		1				1		1				1	8	8		
Pellagra.....			2			2					1	1	30	30		
Pneumonia.....	3	35	18			56	17	17			22	56	855	15.2		
Rheumatism.....	5	28	25			58	1	50	1			52	1,381	26.5	6	
Septicemia.....	2	2				4		1			2	3	70	23.3		
Syphilis:																
Cerebral.....		2	2			4		4				4	120	30		
Congenital.....		5	1			6		3			1	4	120	30		
Secondary.....		25	13	1		39	3	26	6			35	912	26		
Tertiary.....	2	5	3			10		8	1			9	380	42.2		
Tetanus.....		3	1			4		1			3	4	22	5.5		
Tuberculosis.....	2	25	15	3		45		14	22		9	45	655	14.5		
Typhoid fever.....	1	33	21	1		56	24	19			11	54	1,709	31.6		
Whooping cough.....		3	1			4	2	1			1	4	63	15.7		
Injuries.																
Burn:																
Arm.....			2			2		2				2	17	8.5		
Body.....	1	2	1			4	1	3				4	379	94.7		
Face.....		1	1			2		2				2	19	9.5		
Leg.....	1	2				3		2				2	69	34.5		
Scalp.....				1		1		1				1	41	41		
Foreign body in hand.....			1			1		1				1	22	22		
Gunshot wound:																
Abdomen.....		1				1		1				1	21	21		
Arm.....	1					2		2				2	126	63		

Medical and surgical diseases—Continued.

Disease.	Beginning July 1, 1911.	Admitted.				Total.	Discharged.					Total number of days in hospital.	Average number of days in hospital.	Remaining July 1, 1912.	
		Colored.		White.			Recovered.	Improved.	Unimproved.	Not treated.	Died.				Total.
		Male.	Female.	Male.	Female.										
Injuries—Continued.															
Gunshot wound—Con.															
Back.....		2	2			4		4				4	54	13.5	
Foot.....		1				1		1				1	54	54	
Knee.....		2				2	1	1				2	107	53.5	
Temple.....		1				1		1				1	12	12	
Thigh.....		4	1			5	1	3	1			5	68	15.6	
Wounds:															
Contused—															
Ankle.....		2				2		2				2	2	1	
Body.....		3	2	2		7		7				7	43	6.1	
Eye.....		1	1			2		1	1			2	127	63.5	
Forearm.....			1			1		1				1	1	1	
Forehead.....		2				2	1	1				2	8	4	
Hand.....			1	1		2		2				2	29	14.5	
Leg.....		10	1	1		12		12				12	68	5.6	
Scalp.....		2	1			3		3				3	14	4.6	
Shoulder.....		1				1		1				1	2	2	
Incised—															
Abdomen.....		1		1		2	1	1				2	17	8.5	
Face.....		6		1		7		7				7	12	1.7	
Hand.....			1			1		1				1	1	1	
Leg.....				1		1		1				1	4	4	
Lip.....		1				1	1	1				1	12	12	
Scalp.....		2	1	1		4		3	1			4	13	3.2	
Thigh.....		2				2		2				2	10	5	
Lacerated—															
Eyelid.....	1	1	1			3	1	2				3	91		
Face.....	1	3	1			5		5				5	12	2.4	
Knee.....	1	1				1		1				1	18	18	
Perineum.....	1					1	1	1				1	4	4	
Scalp.....	7			1		8	1	5	1			7	29	4.1	1
Wrist.....	3					3	1	2				3	135	45	
Punctured—															
Abdomen.....		1				1	1					1	8	8	
Cornea.....	1	1				1		1				1	36	36	
Foot.....	1					1		1				1	9	9	
Leg.....				1		1		1				1	3	3	
Adenitis—															
Axillary.....		1	1			2		2				2	32	16	
Cervical.....	2	10	12			24	10	8	1		1	20	348	17.4	4
Femoral.....		2				2		2				2	6	3	
Inguinal.....	3	38	7			48	11	27	8			46	669	14.5	2
Parotid.....			1			1	1					1	4	4	
Peritonitis.....			2			2		1			1	2	62	31	
Tubercular peritonitis.....	2	9	6			17	2	8	1		3	14	297	21.2	3
Nervous system.															
Anterior poliomyelitis.....	1	3	5			9		6	2		1	9	785	65.2	
Cerebral hemorrhage.....	3	12	4			19		10			6	16	426	26.6	3
Cerebral tumor.....		2	2			4		1			1	2	33	16.5	2
Concussion brain.....	1	6				7	2	5				7	83	11.8	
Dementia.....	1	1	4			6		3	3			6	249	41.5	
Epilepsy.....	1	10	2	4		17	2	12	2			16	97	6	1
Hernia cerebri.....		1				1		1				1	29	29	
Hydrocephalus.....		1				1									1
Hysteria.....	1	18	6	2		27		24	2	1		27	336	12.3	
Melancholia.....		1				1		1				1	24	24	
Meningitis.....			1			1		1				1	225	225	
Motor aphasia.....		1				1						1	1	1	
Neuralgia.....		5	4			9	1	6	1			8	108	14.5	1
Neurasthenia.....	4	2	15	2		23		21	2			23	373	16	
Neuritis.....		3	1	1		5		4				4	150	37.5	1
Paralysis.....	2	1		2		5		5				5	177	35.4	
Progressive muscular atrophy.....			1			1									1
Tabs dorsalis.....		1				1			1			1	207	207	
Obstetrical.															
Births.....		144	146	1	1	292	264				13	277	3,891	14	15
Births remaining.....	10					10	10					10	196	19.6	
Babies with mother.....		3	3			6				6		6	74	12.3	

Medical and surgical diseases—Continued.

Disease.	Beginning July 1, 1911.	Admitted.					Discharged.						Total number of days in hospital.	Average number of days in hospital.	Remaining July 1, 1912.	
		Colored.		White.		Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.				
		Male.	Female.	Male.	Female.											
Obstetrical—Continued.																
Pregnancy, delivered...	3		323		2	328	309				3	312	6,308	20.2	16	
Pregnancy, undelivered.			57			57		5	40			45	293	6.5	12	
Puerperal eclampsia			2			2					2	2	2	1		
Puerperal sepsis.			3			3	1				1	2	54	27	1	
Puerperium.	12		7			19	16	3				19	448	23.6		
Placenta prævia			2			2					2	2		1		
Stillbirths		18	22			40							2			
Poisoning.																
Alcoholic:																
Acute.		17	8	19	2	46	7	38	1			46	143	3.1		
Chronic.		4	2	12	2	20	1	18			1	20	109	5.4		
Arsenic.									1			1	1	1		
Antointoxication	1	9	5	1		16	4	11				15	163	10.8	1	
Carbolic acid					1	1		1				1	1	1		
Gas.		1	3			4	1	2			1	4	8	2		
Ivy.		1				1	1					1	6	6		
Morphine.				1		1						1	1	1		
Ptomaine.		1				1		1				1	1	1		
Sunstroke.		1	4	2		7	3	3			1	7	15	2.1		
Respiratory system.																
Bronchial asthma.	2	3	1			6		5				5	114	22.8	1	
Bronchitis:																
Acute.		5	3	2		10	2	8				10	154	15.4		
Chronic.		1	7		1	9		7	2			9	144	16		
Pleura:																
Acute pleurisy.	1	9	7			17	5	10			2	17	381	22.4		
Chronic pleurisy.	1	1	1			3	1	2				3	144	48		
Empyema.		7				7	2	3				5	344	68.8	2	
Tracheal stenosis	1		1			2		1			1	2	47	23.5		
Skin and appendage.																
Eczema.	1	5	3			9	3	5	1			9	172	19.1		
Frost bite.	1	7	1			9	5	4				9	531	59		
Herpes zoster.		1				1		1				1	10	10		
Impetigo contagiosa.		1				1	1					1	7	7		
Pemphigus foliaceus.			1			1					1	1	19	19		
Pemphigus neonatorum.		1				1		1				1	28	28		
Scabies.		3				3		2	1			3	15	5		
Tumors and hypertrophies.																
Carcinoma:																
Breast.	2		10			12	4	6			1	11	375	34	1	
Buttock.			2			2		1	1			2	121	60.5		
Cheek.		1	1			2		1			1	2	30	15		
Ethmoid.		1				1			1			1	8	8		
Intestine.	1	1	2			4	1	1			2	4	147	36.7		
Liver.						1			1			1	4	4		
Pancreas.		2	1			3		1			2	3	58	19.3		
Penis.		1				1									1	
Pleura.	1		1			2		1			1	2	306	153		
Scalp.	1					1		1				1	168	168		
Spermatic cord.		1				1		1				1	32	32		
Testes.		1				1	1					1	15	15		
Thyroid gland.			1			1			1			1	4	4		
Condylomata.	1	1	5			7	1	6				7	102	14.5		
Cyst, submaxillary gland.	1					1	1					1	16	16		
Elephantiasis, leg.		1	1			2		2				2	150	75		
Epuila.			1			1		1				1	32	32		
Fibroma breast.			1			1	1					1	22	22		
Gonorrhea:																
Colloid.			2			2	1	1				2	122	61		
Cystic.			1			1		1				1	15	15		
Infected.			1			1									1	
Parenchymatous.			5			5	1		2			3	145	48.3	2	

Medical and surgical diseases—Continued.

Disease.	Beginning July 1, 1911.	Admitted.					Discharged.						Total number of days in hospital.	Average number of days in hospital.	Remaining July 1, 1912.
		Colored.		White.		Total.	Recovered.	Improved.	Unimproved.	Not treated.	Died.	Total.			
		Male.	Female.	Male.	Female.										
<i>Tumors and hypertrophies—Continued.</i>															
Hematoma, abdominal wall.....			1			1	1					1	14	14	
Hematoma, post peritoneal.....		1				1					1	1	15	15	
Hypertrophy cervix.....	1					1		1				1	57	57	
Ingrown toe nail.....		1				1	1					1	2	2	
Keloid neck.....	1		2			3	1	2				3	85	28.3	
Lipoma:															
Back.....		1				1						1	13	13	1
Neck.....			1			1	1					1	195	195	
Thigh.....		2				2	1					1	65	32.5	1
Papilloma bladder.....		1	1			2	1		1			2	72	72	
Ranula.....		1				1	1					1			
Sarcoma:															
Abdominal wall.....			1			1		1				1	32	32	
Eye.....			2			2	1	1				2	46	23	
Femur.....		1				1					1	1	123	123	
Knee.....		1				1		1				1	38	38	
Lympho.....			2			2		1	1			2	15	7.5	
Mandible.....		1				1					1	1	32	32	
Ovary.....	1		3			4	1	1	2			4	77	19.2	
Sebacous cyst.....	1		1			2	2					2	58	29	
Total.....	176	1,329	1,654	95	15	3,269	1,350	1,280	188	7	231	3,056	.....	.....	213

Operations and results.

Operation.	Diagnosis.	White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Died.
		Male.	Female.	Male.	Female.					
Amputation.....	Gangrene of foot.....			6	1	7	3	3		1
	Gangrene of toe.....			2		2		2		
	Sarcoma of femur.....			1		1		1		1
Aspiration.....	Tuberculous of knee.....			1		1		1		
	Ascitis.....			1		1		1		
	Acute dilatation of stomach.....			1		1		1		1
Cauterization.....	Traumatic synovitis.....			1		1		1		
	Tuberculous of knee.....			4	2	6		6		
	Carcinoma cervix.....				2	2		1		1
Cauterization.....	Chancroid penis.....			14		14		14		
	Chancroid vagina.....			1		1		1		
	Chancroid vulva.....			1		1		1		
Cauterization.....	Dogbite of leg.....			1		1		1		
	Infected great toe.....			1		1		1		
	Ulcer of arm.....			1		1		1		
Cauterization.....	Urethral caruncle.....				1	1		1		
Celiotomy:										
	Appendicectomy.....			2	2	4		4		
	Chronic appendicitis.....	1		13	7	21	19	2		
Caesarian section.....	Gangrenous appendicitis.....			1	1	2		1		
	Suppurative appendicitis.....			8	2	10	4	3		3
	Transverse presentation.....			1		1				1
Cholecystostomy.....	Eclampsia.....			1		1		1		
	Contracted pelvis.....			1		1		1		
	Cholecystitis.....			1		1		2		
Colostomy.....	Cholelithiasis.....				4	4	2	1		1
	Intestinal obstruction.....				1	1		1		
	Abdominal abscess.....			1	3	4		4		
Exploratory.....	Carcinoma of pancreas.....			1		1		1		1
	Gunshot wound, abdomen.....			2		2		2		
	Internal hemorrhage.....			1	1	2		1		1

Operations and results—Continued.

Operation.	Diagnosis.	White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Died.
		Male.	Female.	Male.	Female.					
Exploratory	Neurasthenia				1	1				
	Ruptured kidney			1		1				
	Sarcoma of ovaries				2	2	1			
	Suppurative peritonitis			2		2		1		
Freeing adhesions	Tubercular peritonitis			4		4	2	2		
	Intestinal obstruction			6		6	1	1		
	Incarcerated pregnant uterus			1		1				
Gastro-enterostomy	Carcinoma of stomach			2	1	3		2		1
	Carcinoma of pancreas			1	1	2		2		
	Chronic gastric ulcer			1	1	2		2		
Hysterectomy: Abdominal	Carcinoma of cervix				6	6	3	2		1
	Fibromata uteri				2	2	1			1
	Fibromata uteri and salpingitis				7	7	6			
	Fibromata uteri and pregnancy				1	1				
Vaginal	Ruptured uterus				2	2	2			
	Carcinoma of cervix				1	1		1		
	Procidentia uteri				1	1				
Hystero-salpingo-oophorectomy	Bilateral pyosalpingitis			27	27	23	3			1
	Bilateral dermoid cyst of ovary			1	1	1				1
	Ectopic gestation pyosalpingitis and cystic ovary						1	1		
	Pyosalpingitis, cystic ovaries				1	1		1		
	Fibromata uteri			43	43	35	5			3
	Fibromata uteri and cystic ovary			2	2	2				
	Fibromata uteri and pyosalpingitis			12	12	10	1			1
	Fibromata uteri and cystic ovary and pyosalpingitis			3	3	2	1			
	Fibromata uteri and aneurysm of common iliac				1	1	1			
	Cyst of broad ligament				2	2	2			
Hystero-salpingo-oophorectomy and appendectomy	Metritis and salpingitis				2	2	2			
	Ovarian cyst				1	1	1			
	Bilateral pyosalpingitis and appendicitis				5	5	4	1		
	Bilateral cysts of ovary, fibroid, and appendicitis				1	1				1
	Fibromata uteri and appendicitis				3	3	1	2		
	Fibroma uteri				4	4	3			1
	Fibroma uteri and cystic ovary				1	1	1			
	Cystic ovaries				6	6	6			
	Cystic ovaries and endometritis				1	1	1			
	Cystic ovary and appendicitis				2	2	1	1		
Oophorectomy and appendectomy	Hydrosalpinx and appendicitis				1	1	1			
	Bilateral pyosalpingitis and cystic ovary				22	22	20	1		1
	Bilateral salpingitis and cystic ovary				25	25	21	4		
	Cystic ovary				12	12	11	1		
	Ectopic pregnancy				8	8	7	1		
	Fibromata uteri and cystic ovary				1	1		1		
	Hydrosalpingitis				4	4	3	1		
	Retroflexion, salpingitis, and cystic ovary				2	2	2			
	Dermoid cyst and salpingitis				1	1		1		
	Ectopic pregnancy, cystic ovary and appendicitis				2	2	2			
Salpingo-oophorectomy and appendectomy	Salpingitis and cystic ovary				22	22	16	5	1	
	Salpingitis and cystic ovary and appendicitis				13	13	9	3		1
	Adherent clitoris					1		1		
	Paraphimosis				2		2			
	Phimosis				32	32	28	4		
	Phimosis and chancroid				18	18	18			
	Acute antelexion of uterus and endometritis				1	1	1			
	Carcinoma of cervix				1	1		1		
	Dysmenorrhoea				1	1	1			
	Chronic endometritis				1	1			1	
Curettagc	Endometritis and menorrhagia				7	7	4	3		
	Menorrhagia				1	1		1		
	Osteomyelitis of tibia				1	2	3	3		
	Retained secundines				2	27	23	3		1
	Tubercular ulcer				1		2			
	Papillomata of bladder				2		1	1		
	Polypus of bladder				1	1	1			
	Vesical calculus				1	1	2	1	1	

Operations and results—Continued.

Operation.	Diagnosis.	White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Died.
		Male.	Female.	Male.	Female.					
Dilatation.....	Fissure in ano.....			1		1	1			
	Periurethral abscess and stricture.....			1		1		1		
	Rectal stricture.....				1		1			
	Urethral stricture.....			3		3		3		
Dilatation and perineal section.	Periurethral abscess and stricture of prostatic urethra.....			1		1		1		
Eneucleation.....	Incised wound of sclera and cornea.....			1		1		1		
	Iridocyclitis.....			1		1		1		
	Malignant tumor of eyeball.....				1		1			
	Ophthalmitis.....			1		1		1		
	Phthisis bulbi.....			1		1		1		
	Sebaceous cyst.....				1	1	1			
Excision.....	Abscess:									
	Abdominal wall.....				1	1				1
	Bartholinian glands.....				1	1	1			
	Chest wall.....				1	1		1		
	Submental glands.....				1	1		1		
	Vulvo-vaginal.....				1	1	1			
	Adenitis:									
	Cervical.....			5	10	15	7	7		1
	Inguinal.....			11	2	13	8	9	1	
	Axillary.....			1	1	2	2	2		
	Adenoids.....		1	73	67	141	1	141		
	Bunion.....			1		1		1		
	Carcinoma of cervix.....				1	1		1		
	Carcinoma of testis.....			1		1	1			
	Chronic mastitis.....				2	2	2			
	Epididymitis.....			4		4	1	3		
	Epithelioma of anus.....			1		1		1		
	Epithelioma of buttocks.....				2	2		1	1	
	Epithelioma of cheek.....			1		1				1
	Fecal fistula.....				1	1	1			
	Fibroma:									
	Breast.....				1	1	1			
	Face.....			1		1	1			
	Gluteal muscle.....			1		1	1			
	Fissure in ano.....			1	3	4	2	2		
	Fissure in ano and hemorrhoids.....				2	2	2			
	Fistula in ano.....			3	5	8	2	6		
	Fistula of the perineum.....			1		1		1		
	Ganglion of wrist.....			5		5		5		
	Goiter:									
	Colloid.....				2	2	1	1		
	Cystic.....				3	3	2	2		1
	Exophthalmic.....				2	2	2			
	Gumma of testicle.....			2		2	2			
	Hematocele.....			2		2	2			
	Hemorrhoids:									
	External.....			1	1	2	2			
	Internal.....			5	4	9	6	3		
	Hydrocele.....			9		9	7	2		
	Infected hematoma of hip.....				1	1			1	
	Ingrowing toenail.....			3	2	5	5			
	Keloid of abdominal wall.....				1	1			1	
	Keloid of neck.....			2	1	3		1		
	Lipoma of arm.....			2	2	4	4			
	Lipoma of buttocks.....			1		1	1			
	Lympho-sarcoma of hand.....				1	1		1		
	Malignant tumor of spermatic cord.....			1		1	1			
	Nasal polypi.....			2	1	3	3			
	Pingueculum.....			1		1		1		
	Peri-urethral fistula.....			1		1		1		
	Popliteal aneurysm.....			1		1	1			
	Post-operative necrosis of scrotum.....			1		1	1			
	Prolapsed rectum.....			2		2	1	1		
	Sarcoma of chin.....				1	1		1		
	Syphilitic condylomata.....				1	1		1		
	Stricture of rectum.....				1	1		1		
	Sebaceous cyst.....			2	2	4	4			
	Thecitis of dorsum of hand.....			1		1		1		
	Thrombosis of external saphenous.....			1		1		1		
	Thrombo-phlebitis.....			1		1		1		
	Tubercular epididymitis.....			2		2	1	1		
	Tubercular orchitis.....			1		1	1			
	Tubercular sinus of temporal muscle.....				1	1		1		

Operations and results—Continued.

Operation.	Diagnosis.	White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Died.
		Male.	Female.	Male.	Female.					
Excision.....	Tubercular abscess of sternum.....				1	1		1		
	Varicocele.....			1	1	1	1			
	Varicose veins of leg.....			2	7	9	2	7		
Extraction.....	Wart of nose.....			1	1	1	1			
	Cataract.....			4	4	8	1	7		
	Foreign body in eye.....			1	1	1	1			
	Bullets in body.....			3	1	4	1	3		
Forceps delivery.....	Dystocia.....			4	1	5	4	1		
Hemiooplasty.....	Direct inguinal.....				1	1		1		
	Indirect inguinal.....	1		31	6	38	32	6		
	Incarcerated inguinal.....			1	1	1		1		
	Strangulated inguinal.....				2	2	2			
	Umbilical.....				1	1	1			
	Ventral.....	1		1	2	4	3	1		
Incision.....	Abscesses:									
	Abdominal wall.....			1		1		1		
	Alveolar.....				3	3		3		
	Cervical.....			2		2		1		
	Hand.....			1	1	1	1			
	Ischio-rectal.....			3	2	5		5		
	Peritonsillar.....			3	2	5		5		
	Periurethral.....			3		3	2	1		
	Pelvic.....				10	10	5	5		
	Retro-pharyngeal.....			2		2	2			
	Submaxillary.....			4		4		4		
	Tubercular of buttock.....				1	1				1
	Vulvo-vaginal.....				1	1	1			
	Adenitis:									
	Suppurative cervical.....			2	2	4	1	2		1
	Suppurative inguinal.....			7	2	9	1	8		
	Bullet wound of temporal region.....			1		1		1		
	Carbuncle of neck.....			1		1		1		
	Cellulitis:									
	Hand.....			3	1	4		4		
	Knee.....			1		1		1		
	Leg.....			1		1				1
	Neck.....			1	1	2		2		
	Thigh.....			3		3	1	2		
	Chancroidal phimosi.....			11		11	2	9		
	Empyema of frontal sinus.....			1		1		1		
	Empyema of antrum highmore.....			1		1		1		
	Furuncle of neck.....			4		4		4		
	Fistula in ano.....			3	2	5	3	2		
	Fracture of mandible with infection.....				1	1		1		
	Frost bite of foot.....			1		1		1		
	Gangrene of feet.....			1		1	1			
	Gangrene of penis.....			2		2	1			1
	Hematoma of scrotum.....			1		1	1			
	Infected hand.....			4		4	8		8	
	Ludwig's angina.....				1	1		1		
	Mammary abscess.....				1	1		1		
	Needle in hand.....				1	1		1		
	Phimosi.....			2		2		2		
	Post-peritoneal hematoma.....			1		1				1
	Prepatellar bursa.....				2	2		2		
	Punctured wound of abdomen.....			1		1	1			
	Ranula.....			1		1	1			
	Sarcoma of abdominal wall.....				1	1		1		
	Sebaceous cyst.....				1	1	1			
	Suppurative sinusitis.....			2		2		2		
	Thrombotic hemorrhoid.....			4		4		4		
	Tubercular adenitis.....				1	1		1		
	Tubercular sinus of leg.....				1	1		1		
	Tubercular sinus of chin.....			1		1		1		
Induced abortion.....	Puerperal eclampsia.....				1	1				1
Iridectomy.....	Cataract.....			4		4		4		
	Corneal opacity.....			1		1		1		
	Kerato-iridocystitis.....			1	1	2		2		
Ligation of external carotid.....	Carcinoma of floor of mouth.....				1	1		1		
	Sarcoma of jaw.....			1		1				1
Manipulation.....	Acute gonorrheal arthritis of hip.....			1		1		1		
	Ankylosis of right knee.....			1		1	1			
	Contracting of joints due to burns.....				1	1		1		
	Double genu-valgum.....				1	1		1		
	Sacroiliac misplacement.....			1		1		1		

Operations and results—Continued.

Operation.	Diagnosis.	White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Died.
		Male.	Female.	Male.	Female.					
Manipulation	Talipes-equino-varus			1		1	1			
	Tuberculosis of hip			1		1		1		
Needling	Cataract			6	7	12	1	11		
Nephrectomy	Cystic degeneration of kidney			1	1	1	1			
Nephrotomy	Tubercular stricture of ureter			1		1		1		
Osteotomy	Abcess:									
	Frontal sinus			2		2		2		
	Maxillary sinus			4		4		4		
	Middle ear			1		1		1		
	Ankylosis of hip			1	1	1		1		
	Exostosis of tibia			1	1	1		1		
	Genu-valgum			1	1	2		2		
	Mastoiditis			1	1	1				1
	Osteomyelitis of tibia			1	1	1				
	Pathological dislocation of knee joint			1	1	1				
	Ridged valgus of foot			1		1	1			
	Talipes calcaneus			1		1		1		
	Tuberculosis of metatarsal			1		1		1		
Perineal section	Urethral stricture and fistula			4		4	1	2		1
Plastic	Chancroidal ulcer of penis			1		1	1			
	Dacryocystitis			2		2	2			
	Encephalocele			1		1		1		
	Entropion			1		1		1		
	Granulating wound of hand			2		2	2			
	Lacerated wound of right eyelid			1		1	1			
	Lacerated perineum			15		15	12	3		
	Lacerated perineum and cervix			5		5	4	1		
	Lacerated perineum and prolapsus uteri			1		1	1			
	Ptoais			1	1	2		2		
Prostatectomy	Hypertrophied prostate			2		2	1			1
Reduction	Dislocation:									
	Astragalus			1	1	1	1			
	Femur			1	1	2	2			
	Humerus	2		7		9	9			
	Inferior maxilla			4		4	4			
	Phalanx			2		2	2			
	Fracture:									
	Astragalus			1		1		1		
	Clavicle			1	1	2		2		
	Collis			6	3	9	7			
	Femur			3	2	5		5		
	Fibula			3		3		3		
	Humerus	1		10	1	12		12		
	Inferior maxilla			1		1		1		
	Metatarsus			1		1		1		
	Patella			1		1		1		
	Phalanx			6	1	6		6		
	Radius			2	1	3		3		
	Radius and ulna			1		1		1		
	Rib			6		6	6			
	Tibia		1	8		9		9		
	Tibia and fibula			1	1	2		2		
	Ulna			2	3	5	5			
	Prolapsus recti			1		1		1		
Removal	Carcinoma mammae			1	9	10	3	6		
	Foreign body in hand			1	1	2	2			
Resection:										
Intestinal	Carcinoma of colon				2	2	1			1
	Intestinal obstruction				1	1	1			
	Lacerated colon and ruptured uterus				1	1				1
Rib	Empyema			3		3		3		
	Abcess of lung			1		1	1			
	Pleurisy with effusion			1	1	2				2
Skin graft	Burns of chest and leg				1	1	1			
	Ulcer of hand	1				1		1		
Subcutaneous insertion of silk	Elephantiasis			1		1		1		
Suturing	Divided tendon			1		1	1			
	Inched wound	13	1	151	28	193	193			
	Lacerated wound	26	2	206	64	268	298			
	Recto-vaginal fistula			1		1		1		
	Vesico-vaginal fistula				4	4		4		
	Urethral vaginal fistula			1		1	1			

Operations and results—Continued.

Operation.	Diagnosis.	White.		Colored.		Total.	Recovered.	Improved.	Unimproved.	Died.
		Male.	Female.	Male.	Female.					
Suturing.....	Severed internal sphincter ani.....				1	1	1	1		
	Typhoid perforation of ileum.....	1			1					1
Tenotomy.....	Contracture of great toe.....			1		1		1		
	Talipes calcaneus.....		1			1		1		
Tonsillectomy.....	Enlarged tonsils:									
	Faucial.....			105	106	211		211		
	Lingual.....			4	4	8		8		
Trephine.....	Fractured skull.....			11		11	3	5		3
Ventral fixation.....	Retroflexion of uterus.....				2	2	2			
Ventro-suspension.....	Prolapsus uteri.....				1	1	1			
	Retroflexion of uterus.....				4	4	3	1		
	Retroversion of uterus.....				6	6	6			
Wiring of bones.....	Fracture:									
	Clavicle.....			1		1		1		
	Femur.....			1	1	2		2		
	Humerus.....			2		2	2			
	Inferior maxilla.....			1		1	1			
	Metacarpus.....			1		1		1		
	Tibia and fibula (compound).....			1		1		1		
	Ulna.....			1		1		1		
Total.....		47	6	1,028	841	1,922	1,065	798	8	51

Obstetrical record.

Month.	White.		Colored.		Total.	Forceps.	Caesarean section.	Eclampsia.	Lacerations.	Post partum hemorrhage.	Stillbirths.	Twins.	Head.	Breech.	Foot.	Primipara.	Multipara.
	Male.	Female.	Male.	Female.													
July.....			8	20	28	0	0	0	3	0	5	1	27	1	0	12	15
August.....			10	12	22	0	0	0	5	0	1	0	23	0	0	9	13
September.....			10	13	23	0	0	0	10	1	2	0	23	0	1	13	10
October.....			24	13	37	1	0	0	8	0	6	1	37	0	0	19	17
November.....		1	21	11	33	0	0	0	9	0	2	1	33	0	0	15	14
December.....			17	14	31	1	0	0	8	9	6	0	31	0	0	14	17
January.....			7	19	26	0	0	0	6	2	2	0	23	3	0	15	11
February.....			9	14	23	0	1	0	7	1	4	0	23	0	1	11	12
March.....			12	10	22	0	0	0	5	3	3	0	19	2	1	13	8
April.....	1		14	13	28	0	0	0	1	1	1	0	27	0	1	13	15
May.....			18	14	32	1	0	0	6	1	2	0	37	0	0	13	19
June.....			12	16	27	0	2	0	8	1	2	0	25	1	1	16	11
Total.....	1	1	162	168	332	3	3	0	79	10	40	4	320	7	5	166	162
Stillbirths.....					40												
Living babies.....					292												

Anæsthetics.

	White.		Colored.		Total.
	Male.	Female.	Male.	Female.	
Ether.....	3	1	256	508	763
Chloroform.....			1	2	3
Ether and chloroform.....	1		9	4	14
H. M. S. and ether.....			3	4	7
H. M. S. and chloroform.....	1				1
Somnoform.....				6	6
Cocaine and ether.....			1		1
Cocaine.....			349	113	462
Novocaine.....			5	4	9
Ethyl chloride.....			3		3
Total.....	5	1	627	636	1,269

There was a decided increase in the work of the out-patient department over the preceding year, as is shown by the number of new patients, revisits, and surgical dressings.

The service in this department has been somewhat hampered for the want of more room to properly classify the patients and to study the conditions of each applicant free from overcrowding. This can be remedied by excavating the basement of wing 2 and utilizing the space thus obtained for clinical purposes.

In the several clinics of this department 5,710 were treated as follows:

Medical, 2,057; minor surgical, 307; gynecological, 488; nervous, 73; eye, 754; ear, nose, and throat, 1,067; genito-urinary, 307; pediatrics, 181; dermatology, 282; orthopedic, 105; tuberculosis, 89.

Nine thousand one hundred and seventy-seven revisits were made, 4,313 received surgical dressing, and 11,979 prescriptions were compounded.

The following tables show in detail the diseases treated.

Medical and surgical diseases—out-patient department.

Diagnosis.	White.		Colored.		Total.	Diagnosis.	White.		Colored.		Total.
	Male.	Female.	Male.	Female.			Male.	Female.	Male.	Female.	
<i>Medical.</i>						<i>Medical—Continued.</i>					
Alcoholism.....			5	1	6	Myalgia.....			15	14	29
Arthritis infectious.....	1		10	12	23	Myocarditis.....			4	3	7
Arthritis gonorrheal.....			4	2	6	Neuralgia.....	1	3	8	20	32
Asthma, bronchial.....			10	14	24	Nephritis.....					
Anemia.....			4	7	11	Acute.....			5	6	11
Angina pectoris.....			3		3	Chronic.....			16	12	28
Aortic insufficiency.....			11		11	Neurasthenia.....			12	4	16
Aortic stenosis.....			5	1	6	Pharyngitis.....			17	4	21
Arterioclerosis.....			17	2	19	Pleurodynia.....			22	17	39
Autointoxication.....			18	12	30	Pleurisy.....			10	6	16
Bronchitis.....						Pneumonia, lobar.....			5	3	
Acute.....			135	126	161	Rheumatism.....					
Chronic.....			62	38	100	Acute articular.....			17	11	28
Cancer of stomach.....			2		2	Muscular.....			63	67	130
Cardiac dilatation.....			2	1	3	Chronic.....			10	14	24
Cardiac hypertrophy.....			4		4	Stomatitis.....			20	15	35
Cephalalgia.....			2	1	3	Syphilis, secondary.....			22	18	40
Chlorosis.....				4	4	Tachycardia.....				1	1
Constipation.....	2	1	12	38	53	Tonsillitis.....			12	6	18
Coryza, acute.....			42	35	77	Tuberculosis, pulmonary.....			25	16	41
Cystitis, acute.....			4	5	9	Typhoid.....			8	3	11
Debility.....	1		12	20	33	Referred to other clinics.....			35	48	83
Debility, senile.....			2	5	7	Undiagnosed.....	2		97	102	201
Diabetes.....			1	1	2	Total.....	12	6	1,061	978	2,057
Diarrhea.....			5	7	12	Revisits.....					2,976
Empysema.....			4	2	6						
Endocarditis.....				2	2						
Enneuritis.....						<i>Minor surgery.</i>					
Enteritis.....			15	4	19	Abcess:					
Enteroptosis.....			2	4	6	Alveolar.....			1		1
Febricula.....			4	1	5	Hand.....			2		2
Gastralgia.....			5	1	6	Ischio rectal.....				1	1
Gastritis, chronic.....			17	34	51	Neck.....			3		3
Gastroenteritis.....			12	8	20	Adenitis:					
Goitre.....				2	2	Cervical.....			3	4	7
Hemicrania.....			3		3	Inguinal.....			4		4
Hemorrhoids.....			7	3	10	Bursitis, prepatellar.....				1	1
Hepatitis.....			14	6	20	Carbuncle.....			1	1	2
Indigestion:						Contusions.....			4	3	7
Gastric.....			42	26	68	Cellulitis.....			5	8	13
Intestinal.....	2	1	55	61	119	Chancreoid.....			1	8	9
Influenza.....			16	40	56	Cysts, sebaceous.....			6	3	9
Lumbago.....	1		28	10	39	Dog bite.....			1		1
Malaria.....	2	1	10	15	28	Furuncle.....			7	2	9
Measles.....			3	2	5	Frostbite.....			4	4	8
Mitral insufficiency.....			23	35	58						

Medical and surgical diseases—out-patient department—Continued.

Diagnosis.	White.		Colored.		Total.	Diagnosis.	White.		Colored.		Total.
	Male.	Female.	Male.	Female.			Male.	Female.	Male.	Female.	
Minor surgery—Contd.						Dermatology.					
Fibroma:						Acne vulgaris.....			28	12	40
Arm.....				3	3	Chloasma.....				2	2
Breast.....				2	5	Chanoroid.....			1		1
Face.....			5		6	Clavus.....			1	1	2
Fracture:						Dermatitis.....			3		3
Hand.....			2	1	3	Dermatitis venenata.....			4	1	5
Humerus.....				3	3	Rothyma.....			5	1	6
Toe.....				2	2	Eozema.....			2	1	3
Fistulo in ano.....			6		6	Erythema.....				1	1
Foreign body:						Erysipelas.....			1		1
Foot.....			4	2	6	Frambesia.....			1		1
Hand.....			6	3	9	Furunculosis.....			1		1
Ganglion.....			3	2	5	Herpes zoster.....	1		3		4
Hemorrhoids.....				12	19	Impetigo.....			6	3	9
Ingrowing nail.....	1		4	2	7	Keloid.....			5	1	6
Infections:						Leucoderma.....			1	1	2
Finger.....			3	4	7	Pediculosis:					
Hand.....			2	1	3	Capitis.....			1	2	3
Toe.....			1	1	2	Corporis.....	1		2	2	3
Lipoma.....			4	6	10	Pityriasis.....			5	6	11
Lacerations:						Pruritus.....			2	1	3
Scalp.....			3		3	Psoriasis.....				2	2
Hand.....			2	1	3	Scabies.....			10	12	22
Paronychia.....				1	1	Seborrhoea.....			2	2	4
Perlostitis.....			2	1	3	Sycoosis.....			3		3
Peritonitis, tubercular.....			1		1	Syphilis.....	1		27	20	48
Phimosis.....			3	2	5	Tinea tonsurans.....			21		21
Prolapse of rectum.....			2		2	Tinea versicolor.....			5		5
Sprain:						Tinea circinata.....	1		2		3
Arm.....			3	1	4	Urticaria.....			19	8	27
Leg.....			4		4	Varicella.....			4	5	9
Tuberculosis:						Verruca.....			6	3	9
Leg.....			2	1	3	Undiagnosed.....			10	12	22
Chin.....			2		2						
Ulcer, anal.....			1		1	Total.....	3	1	179	99	282
Verruca.....	1			1	2	Revisits.....					312
Vaccinations.....			40	65	105						
Total.....	2		154	151	307	Pediatrics.					
Surgical dressings.....					4,313	Adenitis, cervical.....			2	3	5
Orthopedic.						Anemia.....				1	1
Ankylosis.....			3	1	4	Bronchitis:					
Anterio-pollomyelitis.....			1		1	Acute.....	1		15	15	31
Bursitis:						Chronio.....			8	5	13
Prepatellar.....				1	1	Constipation.....			6	2	8
Subdeltoid.....			1	1	2	Diarrhea.....			1	1	2
Contractures:						Eozema.....			6	7	13
Operative.....			2	1	3	Enteritis.....	1		19	4	24
Infections.....			1	1	2	Gastritis.....			1	3	4
Contusion.....			2	3	5	Hernia, umbilical.....			1	1	2
Genu valgum.....			2	1	3	Ileocolitis.....			3	5	8
Genu varum.....			1	1	2	Indigestion.....			4	1	5
Infectious arthritis.....			2	1	3	Malaria.....			1	2	3
Metatarsalgia.....			1	1	2	Marasmus.....			10	4	14
Periostitis specific.....			2	1	3	Meningitis.....				1	1
Pes planus.....			6	9	15	Paralysis, congenital.....			1		1
Rheumatism, muscular.....			1	1	2	Pharyngitis.....			1	3	4
Sacroiliac relaxation.....			5	6	11	Phimosis.....			3		3
Sprains:						Pneumonia, bronchial.....			1	1	2
Wrist.....			2	1	3	Rachitis.....			4	1	5
Knee.....			5	1	6	Tuberculosis, knee.....				1	1
Talipes equino varus.....			4		4	Urticaria.....			4	6	10
Teno-synovitis.....			2	3	5	Vaginitis.....				1	1
Tuberculosis:						Syphilis, congenital.....			4	1	5
Ankle.....			2	1	3	Undiagnosed.....			10	4	14
Elbow.....				1	1						
Hand.....			2		2	Total.....	2		106	73	181
Hip.....			3	4	7	Revisits.....					90
Knee.....			2		2						
Spine.....			1	1	2	Eye.					
Undiagnosed.....			8	4	12	Angio-sclerosis.....			4	8	12
Total.....			61	44	105	Blepharitis.....			7	2	9
Revisits.....					215	Cataract.....			11	12	23
						Chalazion.....	1		24	17	42
						Circum corneal hyper-					
						trophy.....					

Medical and surgical diseases—out-patient department—Continued.

Diagnosis.	White.		Colored.		Total.
	Male.	Female.	Male.	Female.	
<i>Eye—Continued.</i>					
Corneal opacity.....			4	1	5
Corneal ulcer.....			5	9	14
Choroiditis.....			2	4	6
Conjunctivitis:					
Simple.....			16	11	27
Catarrhal.....			12	14	26
Follicular.....	2		33	43	78
Phlyctenular.....		1	6	6	13
Acute contagious.....		1	4	11	16
Dacryocystitis.....			3	4	7
Episcleritis.....		1	1	1	3
Echymosis.....	1		6	8	10
Epiphora.....			1	1	2
Ectropion.....			2	1	3
Foreign body in eye.....	1		8	2	11
Glaucoma.....			2	2	4
Hordeolum.....			9	5	14
Iritis.....			6	2	8
Kerato-iritis.....			4	6	10
Keratitis:					
Phlyctenular.....			3	4	7
Interstitial.....			5	7	12
Leucoma.....			1	2	3
Optic neuritis.....			1	1	2
Optic atrophy.....			5	4	9
Perforation of cornea.....			1	1	2
Pterygium.....			6	2	8
Refractions.....	1	2	36	102	141
Presbyopia.....			1	5	6
Retinitis.....			11	34	45
Hemorrhagic.....			6	5	11
Neuro-retinitis.....			6	7	12
Chorio-retinitis.....			3	6	9
Retinal ischaemia.....		1	1	3	4
Strabismus.....			1	4	5
Trauma of eye.....			6	5	11
Undiagnosed.....	1	1	45	60	107
Referred to other clinics.....			5	10	15
Total.....	7	7	311	429	754
Revisits.....					1,934
<i>Gynecological.</i>					
Adhesions, postopera-				17	17
tive.....				21	21
Amenorrhea.....				2	2
Abscess, tubo-ovarian.....				4	4
Abortion, spontaneous.....				8	8
Cystocele.....				5	5
Cysts, ovarian.....				5	5
Cystitis.....				13	13
Condylomata.....				4	4
Cervicitis.....				15	15
Dysmenorrhea.....				8	8
Endocervicitis.....				4	4
Endometritis.....				18	18
Fibroid of uterus.....				1	1
Fistula, vesico vaginal.....				2	2
Gonorrhea.....				7	7
Leucorrhea.....				28	28
Lacerated cervix.....				67	67
Lacerated perineum.....				20	20
Menopause.....				6	6
Menorrhagia.....				7	7
Metrorrhagia.....				12	12
Ovaritis.....				45	45
Pregnancy.....				2	2
Pregnancy, ectopic.....				8	8
Pyosalpinx.....				24	24
Salpingitis.....				8	8
Urethritis.....				2	2
Uterine displacements:					
Anteflexion.....				15	15
Prolapse.....					
<i>Gynecological—Contd.</i>					
Uterine displacements—					
Continued.....					
Retroflexion.....				10	10
Retroversion.....				45	45
Undiagnosed.....				54	54
Total.....				488	488
Revisits.....					672
<i>Genito-urinary.</i>					
Abscess, perilurethral.....				4	4
Adenitis, inguinal.....				37	37
Chancres.....				20	20
Chancroid.....				60	60
Cordae.....				1	1
Condylomata.....				4	4
Cystitis.....				2	2
Emission.....				1	1
Gonorrhea:					
Acute.....				1	1
Chronic.....				2	2
Phimosis.....				17	17
Prostatitis.....				9	9
Prostatic hypertrophy.....				3	3
Stricture.....				9	9
Syphilis, secondary.....				10	10
Urethritis:					
Anterior.....				52	52
Posterior.....				66	66
Vesiculitis.....				4	4
Varicocele.....				4	4
Venereal wart.....				1	1
Total.....				307	307
Revisits.....					936
<i>Ear, nose, and throat.</i>					
Abscess:					
Peritonsillar.....				3	2
Retropharyngeal.....				1	1
Adenoids.....	1			73	67
Foreign body, throat.....				3	2
Impaction cerumen.....				38	4
Inflammation:					
External meatus.....				21	3
Eustachian tube.....					24
Laryngitis:					
Acute.....				47	28
Subacute.....				4	2
Chronic.....				1	3
Otitis media.....				18	4
Pharyngitis:					
Acute.....				34	26
Chronic.....				14	1
Specific.....				48	2
Polypl. nasal.....				2	2
Rhinitis:					
Acute.....				38	4
Chronic.....				73	5
Tonsillitis:					
Acute.....				118	17
Follicular.....				76	22
Tonsils, hypertrophy:					
Faucial.....				105	106
Lingual.....				4	1
Turbinate bones, hyper-					
trophy of.....				14	10
Uvulitis.....				8	1
Stenosis:					
Maxillary.....				4	4
Frontal.....				2	2
Mastoid.....				1	2
Spur septum.....				3	3
Total.....	1	1		753	312
Revisits.....					1,067
					1,630

Emergency cases.

Diagnosis.	White.		Colored.		Total.	Diagnosis.	White.		Colored.		Total.
	Male.	Female.	Male.	Female.			Male.	Female.	Male.	Female.	
Acute alcoholism.....	5	1	7	1	14	Infection—Continued.					
Acute gastritis.....			15	6	21	Scalp.....			1		1
Burn:						Tonsil.....				1	1
Body.....		1	1	1	3	Prolapsed rectum.....			4	1	5
Eye.....			3		3	Retention urine.....			6	1	7
Hand.....	2	1	8	4	15	Sprain:					
Leg.....			5	1	6	Ankle.....			18	6	24
Dislocation:						Shoulder.....			4	2	6
Carpus.....			1		1	Wrist.....	3		8	5	16
Humerus.....	2		2	1	5	Stricture urethra.....	1		2		3
Mandible.....			4		4	Wounds:					
Phalanx.....			2	3	5	Confused—					
Tarsus.....			3	3	3	Body.....			6	1	7
Dog bite.....	3		4	1	8	Eye.....	1		4	4	9
Epistaxis.....			4		4	Face.....	1		11	4	16
Foreign body:						Foot.....	3		34	6	43
Ear.....			1	1	2	Hand.....	13		38	10	61
Eye.....	9		11	1	21	Nose.....			1	1	2
Foot.....			6	1	7	Scalp.....	1		4	2	7
Hand.....	1		3	14	18	Shoulder.....	1		4	1	6
Nose.....			1	1	2	Gunshot—					
Rectum.....			2	2	4	Chest.....			1		1
Throat.....			1		1	Foot.....			2		2
Fracture:						Hand.....			1		1
Clavicle.....			1	1	2	Thigh.....			1		1
Femur.....	1		1		2	Incised—					
Fibula.....			1		1	Body.....			3	1	4
Humerus.....			1		1	Face.....	5	1	32	9	47
Metacarpal.....			1		1	Foot and leg.....	6		14	2	22
Nasal bones.....			1		1	Hand and arm.....	10	1	52	30	93
Patella.....			1		1	Scalp.....	4		30	5	39
Phalanx.....	2		5	1	8	Lacerated—					
Radius.....			5	5	10	Eye.....			3	3	6
Ribs.....			1	1	2	Face.....	3	1	35	7	46
Tibia.....	2		2	2	4	Foot.....	1		18	1	20
Ulna.....			1	2	3	Hand.....	12	1	67	10	90
Frost bite.....			2		2	Scalp.....	8	2	51	7	68
Heat exhaustion.....			2		2	Punctured—					
Hysteria.....	1	1	6	7	15	Face.....	1		9	2	12
Infection:						Foot.....	1		25	12	38
Alveolus.....			3	1	4	Hand.....	3		17	7	27
Buttock.....				1	1	Scalp.....			2	1	3
Foot.....		1	4	3	8	Side.....			5	1	6
Glands, neck.....			3	3	6	Miscellaneous.....	1	1	19	9	30
Hand.....	8	1	46	26	81						
Leg.....			4		4						
Prepatellar bursa.....				1	1						
						Total.....	115	13	705	242	1,075

Nativity of patients.

	White.		Colored.			White.		Colored.	
	Male.	Female.	Male.	Female.		Male.	Female.	Male.	Female.
Alabama.....			7	7	Maryland.....	15		280	578
Arkansas.....			6		Massachusetts.....	4		3	
Colorado.....				1	Michigan.....				1
Connecticut.....			1	1	Minnesota.....	2			
Delaware.....	1		3	4	Mississippi.....			6	
District of Columbia.....	25	7	305	3	Missouri.....			2	
Florida.....			4	3	New Hampshire.....	1			
Georgia.....			17	14	New Jersey.....	2		3	7
Illinois.....			3		New York.....	7	1	3	8
Indiana.....			1	1	North Carolina.....			68	69
Iowa.....		1			Ohio.....		1	4	3
Kansas.....	1				Pennsylvania.....	8	1	25	28
Kentucky.....	1				Rhode Island.....				1
Louisiana.....	1	1	2	1	South Carolina.....			39	20
Maine.....	1			1	Tennessee.....			5	2

Nativity of patients—Continued.

	White.		Colored.			White.		Colored.	
	Male.	Female.	Male.	Female.		Male.	Female.	Male.	Female.
Texas.....			3	2	Ireland.....	6	1		
Unknown.....	3		14	3	Italy.....	5			
Vermont.....			1		Panama.....			1	
Virginia.....	11	2	532	553	Poland.....	1			
West Virginia.....	1		11	19	Spain.....	2			1
British West Indies.....			12	4	Switzerland.....				
France.....	4				Total.....	95	15	1,329	1,654
Germany.....	4								

Occupation of patients.

	White.		Colored.			White.		Colored.	
	Male.	Female.	Male.	Female.		Male.	Female.	Male.	Female.
Agent.....	2		1		Jockey.....			1	
Baker.....	1				Laborer.....	27		714	
Barber.....			20		Laundress.....		1		85
Bartender.....			1		Machinist.....	1			
Bellman.....			6		Manicurist.....				3
Blacksmith.....	1		3		Mechanic.....			6	
Bootblack.....			2		Merchant.....			4	
Brickmaker.....			2		Miner.....			3	
Butler.....			9		Minister.....	1		3	
Carpenter.....	4		12		Messenger.....	2		11	
Chamber maid.....				5	Musician.....			5	
Chauffeur.....	1		5		Newsboy.....	1			
Clerk.....	10	1	3		No occupation.....	1	1	43	61
Coachman.....			5		Nurse.....				14
Constable.....	1				Painter.....	8	1	5	
Contractor.....	1		1		Photographer.....			2	
Cook.....			23	20	Physician.....			4	
Dishwasher.....			1		Plasterer.....			5	
Domestic.....		10		1,112	Plumber.....			2	
Dressmaker.....				10	Porter.....	2		49	
Driver.....	1		55		Printer.....	1		2	
Druggist.....	1				Sailor.....			1	
Electrician.....			2		Salesman.....	1		1	
Engineer.....	4		4		Seamstress.....				14
Exhibitor.....			1		Shoemaker.....			2	
Expressman.....			1		Soldier.....	9		1	
Farmer.....	2		55	5	Steward.....	3		3	
Fireman.....			8		Student.....	2	1	138	102
Florist.....			3		Tailor.....			5	
Gardener.....			2		Teacher.....			2	15
Hostler.....			8		Translator.....			1	
Horse trader.....	1				Undertaker.....			2	
Housekeeper.....				192	Walter.....	1		45	10
Huckster.....	1		11		Watchman.....	2		6	
Inventor.....					Total.....	95	15	1,329	1,654
Iron worker.....	1								
Janitor.....			17						

The usual routine of bacteriological, microscopical, and pathological examinations in connection with the study of diseases of patients have been carried on as best as could be done in a room too small, illy adapted to this kind of work, and without the necessary assistance to enable the pathologist to do such research work as would bring unmeasured comfort to many sufferers.

White blood counts.....	259	Examinations of sputum.....	132
Red blood counts.....	30	Museum specimens.....	58
Hemaglobin estimates.....	122	Sections, cut, stained and mounted	193
Widal's reactions.....	106	Autopsies.....	28
Noguchi's reactions.....	176	X-ray photographs.....	319
Malarial examinations.....	25	Numerous miscellaneous examina-	
Differential counts.....	16	tions not recorded.	
Urinalyses.....	2,576		

STATISTICAL SUMMARY.

	1912					1911				
	White.		Colored.		Total.	White.		Colored.		Total.
	Male.	Female.	Male.	Female.		Male.	Female.	Male.	Female.	
In hospital July 1, 1910.....						2	3	70	79	154
In hospital July 1, 1911.....	3		75	98	176					
Admitted.....	95	15	1,329	1,654	3,093	73	9	1,019	1,307	2,408
Births.....	1	1	144	146	292	1	1	145	101	248
Total under care, indoor.....	99	16	1,548	1,898	3,561	76	13	1,243	1,577	2,900
Stillbirths.....			18	22	40			25	17	42
Died.....	5	1	114	111	231	3		117	114	234
Discharged:										
Recovered.....					1,350					1,416
Improved.....					1,240					919
Unimproved.....					188					138
Not treated.....					7					17
Total discharged.....					3,056					2,724
In hospital July 1, 1912:										
United States.....	2	1	43	78	124	3		33	40	76
District of Columbia.....			37	52	89			42	58	100
Total.....	2	1	80	130	213	3		75	98	176
Operations.....	47	6	1,028	841	1,922	78	6	889	794	1,767
Results of operations:										
Recovered.....					1,065					1,439
Improved.....					789					264
Unimproved.....					8					6
Died.....					51					58
Emergencies.....	115	13	705	242	1,075	110	14	664	195	983
In out-patient department:										
Medical.....	12	6	1,061	978	2,057			666	592	1,258
Minor surgical.....	2		154	151	307	3	2	203	143	351
Gynecological.....				488	488		2		480	482
Nervous.....	1		48	24	73	3	1	96	92	192
Eye.....	7	7	311	429	754	4		226	324	554
Ear, nose, and throat.....	1	1	753	312	1,067	3	1	221	212	437
Genito-urinary.....			307		307			778		778
Pediatrics.....	2		106	73	181	6	7	153	178	344
Dermatology.....	3	1	179	99	282	6	1	182	125	314
Orthopedic.....			61	44	105			25	13	38
Tuberculoals.....			48	41	89			51	40	91
Total.....	28	15	3,028	2,639	5,710	25	14	2,601	2,199	4,899
Number of surgical dressings.....					4,313					
Number of revisits.....					9,177					5,637
Days maintenance:										
United States patients.....					30,338					22,196
District of Columbia patients.....					37,949					35,855
Officers and employees.....					34,716					31,205
Total days maintenance.....					102,003					89,256
Cost of patients and employees per day, based on gross expense.....					\$0.83					\$0.86
Largest number of patients at any one time.....					229					192
Smallest number of patients at any one time.....					163					163
Daily average number of patients.....					197.8					168.1
Number admitted from District of Colum- bia, including births.....					1,853					1,882
Number admitted from United States, in- cluding births.....					1,708					1,018

FINANCIAL STATEMENTS.

Board of Charities account from July 1, 1905, to June 30, 1912.

Fiscal year ended—	Adults.	Children.	Babies.	Total.	Bills rendered.	Payment received.	Balance unpaid.
1906.....	1,675	96	165	1,936	\$38,223.75	\$25,500	\$12,723.75
1907.....	1,809	119	167	2,095	36,184.80	25,500	10,684.80
1908.....	1,661	119	184	1,964	34,470.55	25,500	8,970.55
1909.....	1,566	89	181	1,836	38,846.40	25,500	13,346.40
1910.....	1,719	127	176	2,018	41,640.85	25,500	16,140.85
1911.....	1,584	139	159	1,882	37,139.36	25,500	11,639.36
1912.....	1,550	123	180	1,853	39,239.86	34,000	5,239.86
Total.....	11,564	802	1,212	13,584	265,745.57	187,000	78,745.57

This account shows an unpaid balance of \$78,745.57, which in all probability will increase from year to year, unless the Commissioners of the District of Columbia can see their way clear to include in future estimates to Congress a sum sufficient to cover the contract price for the care and treatment of all patients whom they send to the hospital. The bills rendered during the past year for District patients amount to \$39,239.86, or \$5,239.86 more than the appropriation received for this purpose.

Statement of the expenditure of the appropriation for salaries, sundry civil act approved June 25, 1909 (35 Stats., 992).

Surgeon in chief.....	\$3,000
Resident assistant surgeon.....	1,500
Resident physician.....	1,200
Clerk.....	1,400
Assistant clerks (2).....	{ 600
Pharmacist.....	720
Resident assistant pharmacist.....	120
Pathologist.....	2,000
Resident anaesthetist.....	1,200
Resident superintendent of nurses.....	1,080
Resident assistant superintendent of nurses.....	540
Resident night supervisor of nurses.....	480
Resident head nurses (2), \$480 each.....	960
Seamstress.....	300
Engineer.....	1,200
Assistant engineer.....	900
Fireman (3), \$720 each.....	2,160
Resident pupil nurses (42), \$60 each.....	2,520
Maids (3), \$168 each.....	504
Resident orderlies (2), \$300 each.....	600
Resident orderlies (4), \$240 each.....	960
Night orderly.....	276
Steward.....	720
Cook, head.....	540
Cook, second.....	360
Cook, third.....	288
Waiters (3), \$144 each.....	432
Resident driver.....	360
Driver.....	360
Laundryman.....	420
Laundresses (5), \$144 each.....	720
Resident watchmen (2), \$200 each.....	400
Laborer.....	216
Laborers (2), \$180 each.....	360
Total.....	29,996

Comparative statement of receipts and expenditures.

	1912	1911
RECEIPTS.		
Appropriation, sundry civil bill:		
For support.....	\$21,000.00	\$21,000.00
Salaries.....	30,000.00	29,500.00
By transfer from Howard University, on account salaries.....	2,040.00	.....
Appropriation, District of Columbia—appropriation (under contract with Board of Charities).....	34,000.00	25,500.00
By transfer from Howard University, account fuel.....	1,998.52	2,993.50
	\$89,038.52	\$78,993.50
EXPENDITURES.		
Miscellaneous (fuel, light, clothing, forage, medicines, etc.).....	31,109.85	28,289.65
Subsistence.....	22,828.93	20,932.40
Salaries.....	31,921.52	29,365.72
	85,929.30	78,577.77

Comparative statement of miscellaneous expenditures.

	1912	1911		1912	1911
Drugs.....	\$2,365.38	\$2,439.19	Repairs:		
Equipment:			Buildings.....	\$1,162.93	\$1,445.21
Books.....	19.05	26.40	Furniture and furnishings.....	229.89	.....
Drug room.....	36.91	.....	Instruments, surgical.....	140.14	.....
Kitchen.....	111.30	65.86	Kitchen utensils.....	71.35	83.15
Laboratory.....	109.90	.....	Laboratory.....	12.40	.....
Laundry.....	12.06	.....	Laundry.....	46.10	.....
Medical.....	186.32	625.00	Power plant.....	702.03	69.96
Office.....	332.32	.....	Stable.....	79.80	.....
Power plant.....	424.54	158.23	Stable service.....	118.04	102.01
Plumber's tools.....	97.28	12.72	Stationery.....	359.67	578.73
Structure.....	381.08	.....	Structures.....	179.00	341.50
Surgical.....	897.09	711.73	Telephone.....	343.18	294.32
Stable.....	117.40	252.68	Supplies:		
X ray.....	234.50	115.50	Hospital and household.....	3,030.06	2,720.71
Electric supplies.....	.....	156.14	Cleaning.....	397.90	.....
Miscellaneous.....	231.58	.....	Laboratory.....	215.39	247.44
Forage.....	371.28	344.51	Laundry.....	472.82	639.79
Fuel:			Mechanics.....	996.38	220.06
Coal—			Painters.....	200.01	.....
Anthracite.....	195.00	.....	Plumber's.....	285.23	.....
Bituminous.....	9,801.54	7,432.30	Medical.....	753.52	887.23
Wood.....	61.20	71.30	Surgical.....	2,592.63	2,368.16
Furniture and furnishings.....	285.90	698.25	Wearing apparel.....	210.92	188.81
Heat, light, and power:			X ray.....	62.47	.....
Current.....	116.14	3,260.67	Unclassified.....	165.70	58.61
Gas.....	656.51	503.78			
Kerosene.....	4.23	.....	Total.....	31,169.85	28,289.65
Hauling ashes.....	263.88	.....			
Weighing coal.....	27.45	.....			
Materials.....	993.37	1,191.71			

Comparative statement of subsistence expenditures.

	1912	1911		1912	1911
Beverages—			Cereal food products—Con.		
Coffee.....	\$413.04	\$279.24	Hominy, coarse.....	\$5.07	.....
Chocolate.....	19.44	.....	Hominy Grits.....	11.25	.....
Cocoa.....	101.37	.....	Meal, corn.....	34.20	\$30.09
Tea.....	147.31	109.27	Oats, rolled.....	20.29	.....
Canned goods.....	1,097.01	1,226.68	Rice.....	65.27	.....
Condiments and flavors.....	179.16	179.52	Miscellaneous.....	73.27	.....
Cereal food products:			Breakfast food.....	.....	582.10
Barley.....	2.43	.....	Dairy products:		
Bread.....	1,663.00	1,494.36	Butter.....	2,190.86	1,853.19
Crackers.....	304.78	237.32	Buttermilk.....	13.30	.....
Cream of Wheat.....	64.38	.....	Cheese.....	48.93	39.32
Flakes, Corn.....	64.58	.....	Milk, fresh.....	2,942.35	2,162.79
Flour.....	230.00	292.50	Eggs.....	1,091.62	927.88

Comparative statement of subsistence expenditures—Continued.

	1912	1911		1912	1911
Fats and oils.....	\$251.82		Meats—Continued.		
Fish:			Beef tongue.....	\$131.25	
Clams.....	13.80	\$38.40	Bologna.....	10.19	
Codfish.....	62.40		Ham, smoked.....	385.69	
Fresh.....	490.43	498.15	Liver.....	84.76	\$78.63
Herring, smoked.....	17.40		Mutton.....	868.48	969.93
Mackerel.....	127.40		Pork, fresh.....	84.09	139.02
Oysters.....	177.75	163.80	Sausage, smoked.....	70.80	78.06
Salt.....		136.40	Sausage, green.....	49.36	60.08
Fowl:			Veal.....	75.42	98.52
Chicken.....	1,764.42	1,772.78	Saccharine products:		
Turkey.....	106.00	80.00	Molasses.....	3.16	
Fruits and nuts.....	615.55		Sugar, granulated.....	1,070.65	954.52
Fruits, dried.....	468.80		Sugar, powdered.....	3.79	
Ice.....	1,119.28	1,006.69	Sirup.....	15.41	
Meats:			Soft drinks, ale, ginger.....	20.04	
Bacon, breakfast.....	426.06		Vegetables, green.....	1,718.06	1,764.43
Bacon, shoulders.....	479.26	1,577.56	Wine, sherry.....	119.70	24.75
Beef.....	1,437.27	1,617.60	Miscellaneous.....	131.80	265.17
Beef, corned.....	61.64				
Beef, dried.....	88.89		Total.....	22,838.93	20,932.40

NEEDS.

In the last annual report several urgent and important needs were pointed out as necessary to render more efficient service. No relief having been provided, they still exist and are therefore renewed.

First and foremost is the urgent necessity of a building for pathological work. This is of primary importance as offering the only means for a scientific study of diseases and the safest and surest way to obtain recoveries therefrom. Such a building, it is estimated, will cost \$25,000.

An increase in the force of employees is of equal importance. By the addition of the following, better work can be done, and the long hours of daily service, which many of the employees now perform can be reduced to the greater satisfaction of all concerned.

Stores keeper.....	\$1,400
Engineer.....	1,000
2 firemen, \$720.....	1,440
Assistant anesthetist.....	1,000
Director of clinics.....	720
Laundryman.....	300
Cook.....	360
10 pupil nurses, \$60.....	600
2 telephone operators, \$380.....	760
3 laborers, \$300.....	900
2 maids, \$300.....	600
Seamstress.....	300
Dishwasher.....	260
Ambulance driver.....	360

A refrigerating plant should be installed at an early date so as to provide proper facilities for keeping perishable foodstuff, and also to enable the hospital to keep the remains of deceased patients in a desirable state of preservation until removed therefrom. The cost of the installation of this plant would not exceed \$4,000.

An ash conveyor to complete the remodeling of the central heating and power plant, which will cost \$3,000, is also needed.

A fence inclosing the grounds is among the urgent needs. Nothing can be done in the way of beautifying the same, nor can they be

utilized for the benefit of the patients until properly fenced, which will cost, it is thought, not more than \$12,000.

TRAINING SCHOOL FOR NURSES.

The graduating exercises were held in the Andrew Rankin Memorial Chapel, May 10, 1912, at which time six nurses received their diplomas, the first to graduate from the three-year course.

Graduates of 1912.

Carrie Oneita Abner, Alabama.	Estelle Althea Christian, Virginia.
Marguerite Ellena Cecil Butler, Massachusetts.	Sarah Ellen Eaton, North Carolina.
Elizabeth Florida Ann Carter, Virginia.	Mary Ann Simmons, Pennsylvania.

The course of lectures was delivered by the following staff:

Gynecology.....	W. A. Warfield, M. D.
Anatomy and physiology.....	S. L. Carson, M. D.
Hygiene.....	C. A. Brooks, M. D.
Theoretical nursing.....	Laura R. MacHale.
Dietetics, practical and theoretical nursing.....	Emma M. Irwin.
Diseases of the eye.....	M. O. Dumas, M. D.
Medical nursing.....	Caryl Burbank, M. D.
Diseases of children.....	John R. Francis, M. D.
Operative surgery.....	H. H. Kerr, M. D.
Obstetrics.....	E. D. Williston, M. D.
Materia medica and therapeutics.....	John W. Mitchell, M. D.
Urinalysis and bacteriology.....	W. Van Swearingen, M. D.
Neurology.....	E. C. A. Wilson, M. D.
Ear, nose, and throat.....	Reginald Walker, M. D.

Applications, resignations, dismissals, etc.

Applications received.....	81	Rejected after probation.....	0
Applicants taken on probation.....	6	Resigned.....	4
Accepted.....	6		

Nursing staff.

Superintendent of nurses.....	1	Seniors.....	6
Assistant superintendent of nurses..	1	Intermediate class.....	18
Night supervisor.....	1	Juniors.....	18
Head nurses.....	2		

COURSE OF INSTRUCTION.

FIRST YEAR.

Anatomy—Six lectures, one hour each.
 Physiology—Eight lectures, one hour each.
 Hygiene—Four lectures, one hour each.
 Bandaging—Two lectures, one hour each.
 Practical and theoretical nursing—One lecture a week, one hour each, from October 1 to May 1.

SECOND YEAR.

Materia medica—Six lectures, one hour each.
 Bacteriology and urinalysis—Five lectures, one hour each.
 Medical nursing, including the acute infectious diseases—Five lectures, one hour each.
 Surgical nursing, including anæsthetics—Eight lectures, one hour each.
 Dietetics—Ten lectures, one hour each.
 Practical and theoretical nursing—One lecture a week, one hour each, from October 1 to May 1.

THIRD YEAR.

Obstetrics—Six lectures, one hour each.

Children's diseases, including the feeding of infants—Four lectures, one hour each.

Diseases of the eye—Three lectures, one hour each.

Diseases of the ear, nose, and throat—Four lectures, one hour each.

Gynecology—Six lectures, one hour each.

Nervous diseases—Four lectures, one hour each.

Practical and theoretical nursing—One lecture a week, one hour each from October 1 to May 1.

First-year practical demonstrations.

[Each lesson one and one-half hours long.]

OCTOBER.

First lesson—Bed making; management of helpless patients—moving, changing, giving baths.

Second lesson—Note taking; pulse, temperature, respiration, mental condition.

Third lesson—The temperature; the thermometer, its use and care; excretions; eruptions.

Fourth lesson—Pulse; quality, rhythm, number, etc.; hypodermic syringe, its care and use.

NOVEMBER.

Fifth lesson—Fomentations; poultices; sand bags; ice cap, its care; ice coil.

Sixth lesson—The hot-water bag or bottle, use and abuse; care of instruments; sterilizing, etc.; care of rubber gloves, methods of sterilizing.

Seventh lesson—Administering of enemata, douches, cantharides, etc.; Murphy infusion.

Eighth lesson—Counter irritations, mustard, cantharides, etc.; physiological action; dry cupping.

Ninth lesson—Hypodermoclysis; intra-venous or infusion; preparation of solution; patient, instruments.

DECEMBER.

Tenth lesson—Positions: Dorsal, Sims, Trendelenberg, Fowler's, knee and chest; lithotomy.

Eleventh lesson—Prevention and treatment of bed sores.

Twelfth lesson—Weights and measures, solutions.

Thirteenth lesson—Disinfection of clothing, excreta, sputum, etc.

JANUARY.

Fourteenth lesson—Bandaging, making and use; material, Esmark.

Fifteenth lesson—Care of patient before, during, and after anæsthesia.

Sixteenth lesson—Care of patient before, during, and after operation, and preparation of patient for operation.

Seventeenth lesson—Preparation of room for operation, sterilization, etc.

FEBRUARY.

Eighteenth lesson—Urine analysis, specific gravity, quantity reaction, Fehling's and Heller's tests.

Nineteenth lesson—Contagious-disease nursing, care of convalescents, feeding in particular.

Twentieth lesson—Infant feeding, sterilization, pasteurizing, child's first bath, care of eyes, buttocks, etc.

Twenty-first lesson—Administration of drugs, use and effect.

MARCH.

Twenty-second lesson—Care of the dead.

Twenty-third lesson—Fumigation.

Course in cooking.

LESSON I.

Barley water.

Toast water.

Albuminized milk.

Rice water.

Flaxseed lemonade.

Orangeade.

Oatmeal water.

Lemonade.

Koumiss.

LESSON II.

Eggnog.
Boiled coffee.Wine whey.
Tea.French coffee.
Coco.

LESSON III.

Broiled beef tea.
Arrowroot gruel.
Barley gruel.Bottled beef tea.
Farina gruel.
Indian gruel.Flour gruel.
Cracker gruel.
Hominy.

LESSON IV.

Dry toast.
Bread and butter sandwiches.
Boiled eggs.Dropped egg on toast.
Water toast.
Raw-beef sandwiches.Souffled egg.
Milk toast.
Scrambled egg.

LESSON V.

Foamy omelet.
Eggs in butter.
Soft custard.
White custard.Bread omelet.
Eggs a la goldenrod.
Junket custard.Baked apples.
French omelet.
Baked custard.

LESSON VI.

Raw oysters.
Boiled oysters.
Clam stew.Fancy roast.
Oyster roast.
Riced potatoes.Oyster stew.
Clam water.
Mashed potatoes.

LESSON VII.

Broiled fish.
Potatoes au gratin.
Creamed sweetbreads.Broiled potatoes.
White sauce.
Broiled sweetbreads.Creamed potatoes.
Boiled rice.

LESSON VIII.

Mutton broth.
Broiled steak.
Broiled bone birds.
Cream soup.Chicken broth.
Broiled chops.
Baked potatoes.Steamed rice.
Crisp crackers.
Tomato.

LESSON IX.

Lemon jelly.
Irish moss blanc mange.
Snow pudding.Lemon ice.
Orange jelly.
Rice pudding.Tapioca cream.
Pineapple ice.
Wine jelly.

LESSON X.

Orange ice.
Lemon sherbet.

Vanilla ice cream.

Chocolate ice cream.

Three-year schedule.

SURGICAL EXPERIENCE.

Ward.	Day duty.	Night duty.
	<i>Months.</i>	<i>Months.</i>
Genito-urinary.....	3	1
Female surgical.....	3	1
Male surgical.....	3	1
Gynecological.....	3	1
Obstetrical.....	3	1
Emergency operating room.....	3	1
Main operating room.....	3	1
Total.....	21	6

The surgical experience includes four months' gynecological and four months' obstetrical.

Three-year schedule—Continued.

MEDICAL EXPERIENCE.

Ward.	Day duty.	Night duty
	<i>Months.</i>	<i>Months.</i>
Male medical.....	3	1
Female medical.....	3	1
Diet kitchen.....	1	.....
Total.....	7	2
Grand total (24 months each year).....	28	8

The medical experience includes two months in the children's ward.

OCCUPATION AND RESIDENCE OF GRADUATES.

1896.

Ashton, Luci V., private nurse, Kansas City, Mo.
 Blackburn, N. L., private nurse, Philadelphia, Pa.
 Burke, Julia (Mrs. Phillips), Jacksonville, Fla.
 Fleetwood, Sara I., deceased.
 Foust, Isabella L., private nurse, Winston, N. C.
 Gibson, Katherine C., Bureau of Engraving and Printing, Washington, D. C.
 Green, Anna N., deceased.
 Owens, Laura A., private nurse, Washington, D. C.
 Pierce, Letitia (Mrs. Blair), Washington, D. C.
 Ricks, Antoinette M. (Mrs. Demby), Kansas City, Mo.
 Robinson, Annie B., superintendent and matron, Good Samaritan Hospital, Charlotte, N. C.
 Shorter, Sarah A., private nurse, Washington, D. C.
 Simms, Annie A. (Mrs. Johnson), Baltimore, Md.
 Smith, Gertrude (Mrs. Thorn), Washington, D. C.
 Tyler, Elizabeth, private nurse, Northampton, Mass.

1897.

Caldwell, Amanda J. (Mrs. Darrell), Dallas, Tex.
 Combe, Annie, massage specialist, Washington, D. C.
 Green, Lucille (Mrs. Tibbs), St. Paul, Minn.
 Griffin, G. Josephine, private nurse, Washington, D. C.
 Haithcock, Ada, private nurse, Washington, D. C.
 King, Annie C. (Mrs. Hughes), Richmond, Va.
 Rollins, Willie M. (Mrs. Frazier), Washington, D. C.
 Smith, S. May, private nurse, Troy, N. Y.
 Thomas, Annie M., private nurse, Washington, D. C.

Thompson, Della R. (Mrs. Davis), Vienna, Va.
 Underhill, Katherine P. (Mrs. Wm. Moten), Washington, D. C.
 Webb, Eva, private nurse, Washington, D. C.
 Warner, Florence A., private nurse, Springfield, Mass.
 Young, Lola E. M., private nurse, Greenville, S. C.

1898.

Bannister, Carrie J., private nurse, Washington, D. C.
 Bennett, Florence R., private nurse, Baltimore, Md.
 Cabannis, Martha E., night supervisor, Freedmen's Hospital, Washington, D. C.
 Carter, Edith M., private nurse, New Rochelle, N. Y.
 Davis, Annie M., private nurse, Shelbyville, Tenn.
 Ennis, Sarah J. (Mrs. Brooks), Washington, D. C.
 Gaines, Mary R., private nurse, Oakland, Cal.
 Geder, Isabella, private nurse, Binghamton, N. Y.
 Hurlong, Mary A., private nurse, Asheville, N. C.
 King, Carrie M. (Mrs. Foreman), Washington, D. C.
 Robinson, Amelia A., private nurse, Nashville, Tenn.
 Russell, Ruby E., private nurse, Charlottesville, Va.
 Stanton, Priscilla (Mrs. Todd), Pittsburgh, Pa.
 Sumby, Lillie May, private nurse, Washington, D. C.
 Valentine, J. Ella, private nurse, Lebanon, Ind.
 Whitson, Clara E. (Mrs. Howe), Washington, D. C.

1899.

Banks, Effie P. (Mrs. Sykes), Indianapolis, Ind.
 Brown, Agnes M., private nurse, Meyersdale, Pa.

Coleman, Georgia A., private nurse, Washington, D. C.
 Diamond, S. Matthew (Mrs. Dibble), St. Louis, Mo.
 Francis, Bertha A., head nurse, Home Hospital, Birmingham, Ala.
 Hairston, Lula C. (Mrs. Crews), Winston, N. C.
 Hankins, Mintha C., private nurse, Washington, D. C.
 Hendricks, Eliza R. (Mrs. Brown).
 Henry, Lillian M., private nurse, Downingtown, Pa.
 Hoge, Carrie M., private nurse, Washington, D. C.
 Keemer, Jessie E. (Mrs. Robinson), Providence, R. I.
 McEwen, Irene O. (Mrs. Green), Pensacola, Fla.
 Rich, Anna, private nurse, Hartford, Conn.
 Scott, Helen V. (Mrs. Cole), Swansboro, Ga.
 Thompson, Isabella, private nurse, New Orleans, La.
 Wilson, Emma C., private nurse, Montgomery, Ala.
 Williams, Elmira E., deceased.

1900.

Clarke, Mary F., private nurse, Richmond, Va.
 Hamilton, Priscilla, deceased.
 Hawkins, Nannie E., private nurse, Charlotte, N. C.
 Hunton, Mary A. (Mrs. Gordon), St. Louis, Mo.
 Johnson, Hattie B., private nurse, Mount Pleasant, N. C.
 Lewis, Eva P., private nurse, Manassas, Va.
 Mickens, Marcella C., private nurse, Pittsburgh, Pa.
 Middleton, Haga H., private nurse, Charleston, S. C.
 Moody, Annie L., private nurse, Washington, D. C.
 Smith, Cora V., private nurse, Camden, N. J.
 Winfield, Laura, private nurse, Ware, Mass.

1901.

Allen, Margaret A., private nurse, Washington, D. C.
 Barks, Susan C., private nurse, Washington, D. C.
 Campbell, B. N., private nurse, Montgomery, Ala.
 Dey, Mary L., private nurse, Philadelphia, Pa.
 Hackley, Mamie E. (Mrs. Ash), Philadelphia, Pa.
 Hanson, Carrie L., private nurse, Baltimore, Md.
 Harrell, Catherine S. (Mrs. Butler), Texas.

Hunter, Bessie, private nurse, Washington, D. C.
 Jackson, Eliza A., private nurse, Richmond, Va.
 Jones, Mary J., private nurse, Washington, D. C.
 Powell, Gussie D., private nurse, Richmond, Va.
 Rhone, Charlotte S., private nurse, Newbern, N. C.
 Robinson, Frances A., private nurse, Newbern, N. C.
 Thomas, Bertha J., head nurse, Freedmen's Hospital, Washington, D. C.
 Walcott, Louisa M., private nurse, Rockhill, S. C.
 Whitley, Florence A., private nurse, Newbern, N. C.

1902.

Adams, Ella C., private nurse, Philadelphia, Pa.
 Baker, Vera L., head nurse, State Hospital, Goldsboro, N. C.
 Booth, Mary S., private nurse, head nurse Holly's sanitorium, Hinton, W. Va.
 Delisse, Augusta V., private nurse, Brooklyn, N. Y.
 Dias, Frances C., private nurse, Philadelphia, Pa.
 Johnson, Gertrude B., private nurse, Niagara Falls, N. Y.
 Mason, Corinna (Mrs. Phillips), Springfield, Mass.
 Nichols, Florence L. (Mrs. Avant), Charlotte, N. C.
 Rogers, Amanda, private nurse, Indianapolis, Ind.
 Roper, Maggie A., private nurse, Galveston, Tex.
 Thompson, Rachel A. (Mrs. Thomas), deceased.

1903.

Browne, E. M., head nurse, Douglass Hospital, Philadelphia, Pa.
 Baltimore, Mary E., private nurse, Harrisburg, Pa.
 Christie, Sarah E., private nurse, Chester, Pa.
 Coates, Maiella E., private nurse, Washington, D. C.
 Hargrave, L. S., private nurse, Trenton, N. J.
 Johnson, L. D., private nurse, Warrenton, N. C.
 Johnson, Nellie V., private nurse, Abbeville, S. C.
 Latney, Carrie L. (Mrs. Bowie), Washington, D. C.
 Love, Ellen V., private nurse, Lumberton, N. C.
 Purcell, E. J., private nurse, Brunswick, Ga.
 Rollins, Clara A., private nurse, Washington, D. C.

Rutherford, Anna L., private nurse, Kingston, N. C.
 Sharp, Carrie M. (Mrs. Morgan), Petersburg, Va.
 Valentine, J. L. (Mrs. Dial), Jacksonville, Fla.
 Yarbrough, S. V. S., private nurse, Columbus, Ga.

1904.

Baker, Hattie E., private nurse, Darlington, S. C.
 Blackwell, W. Lucille (Mrs. Morris), New York, N. Y.
 Carter, Mary E., private nurse, Rippon, W. Va.
 Carter, Elizabeth V., head nurse, Mercy Hospital, Philadelphia, Pa.
 Grant, Anna E., private nurse, Savannah, Ga.
 Gilmore, Mary E., private nurse, Leavenworth, Kans.
 James, Aleathia D. (Mrs. Franklin), Jacksonville, Fla.
 Jeffries, Emma M., private nurse, Redbank, N. J.
 Jones, Violet, private nurse, Hartford, Conn.
 Lewis, Louzetta (Mrs. Mitchell), Montgomery, Ala.
 Richardson, Effie V. (Mrs. McCoy), Washington, D. C.
 Thomas, Marie E. (Mrs. Jones), Topeka, Kans.

1905.

Braxton, Margaret, private nurse, Hartford, Conn.
 Brooks, Alpha E. (Mrs. Jones), Fairmont Heights, D. C.
 Carter, Marion M., private nurse, Washington, D. C.
 Henderson, Hattie E., private nurse, Cleveland, Ohio.
 Holmes, Julia E., private nurse, Plainfield, N. J.
 Jefferson, Roxanna M., private nurse, Bristol, Tenn.
 Kidd, Bertha M. (Mrs. Harris), Washington, D. C.
 Long, Ida E., private nurse, Newark, N. J.
 Maston, Mary J., head nurse, Red Cross Sanitarium, Louisville, Ky.
 Scott, Julia E., private nurse, New Haven, Conn.
 Teabout, Stella, private nurse, Richfield Springs, N. Y.
 Taliaferro, Olivia, private nurse, Anacostia, D. C.
 Terry, Jessie C., private nurse, Los Angeles, Cal.
 Williams, Daisy M. (Mrs. Moten), Sherman, Tex.
 Williams, Mary T., private nurse, Ware Neck, Va.
 Wilson, Annabel, private nurse, Baltimore, Md.

1906.

Barnes, Annie, private nurse, Baltimore, Md.
 Bearce, Daisy M., private nurse, Rye, N. Y.
 Burreas, Mary E. (Mrs. Wormley), Ardwick, S. C.
 Gordon, Mary B., private nurse, Washington, D. C.
 Hall, Iona M., private nurse, Troy, Ohio.
 Henderson, Sara O., private nurse, Newport, R. I.
 Johnson, Harriett C., private nurse, Cleveland, Ohio.
 Lewis, Willie A., private nurse, Atlanta, Ga.
 Lucas, Marion V., head nurse, Freedmen's Hospital, Washington, D. C.
 McDougal, Colota M., district nurse, Indianapolis, Ind.
 McKnight, Viola, superintendent of nurses, Mercy Hospital, Philadelphia, Pa.
 Marshall, Mary E., private nurse, Morristown, Tenn.
 Merritt, Mary E., superintendent of nurses, Mitchell Hospital, Leavenworth, Kans.

1907.

Bullock, Blanche V., private nurse, Richmond, Va.
 Childs, Helen D., private nurse, Philadelphia, Pa.
 Escoffery, Lula M., private nurse, Atlantic City, N. J.
 Harmon, Nannie M., private nurse, Tip Top, Va.
 Porter, Susan H., dean woman's department, Tuskegee, Ala.
 Payton, Lillian M., private nurse, Washington, D. C.
 Peck, Alice M., private nurse, Baltimore, Md.
 Rose, Julia M., private nurse, Lynchburg, Va.
 Slocum, Mary E., private nurse, Providence, R. I.
 Smith, Minnie M., private nurse, Amherst, Mass.
 Taylor, Loretta P., private nurse, Washington, D. C.
 Wright, Nena J., private nurse, Washington, D. C.

1908.

Briggs, Cornelia K., private nurse, Troy, N. Y.
 Denning, Clara S., private nurse, Canajoharie, N. Y.
 Douglass, Kate E., private nurse, New Bedford, Mass.
 Donaldson, Vesta L., private nurse, Ocean Grove, N. J.
 Fray, Julia, private nurse, Washington, D. C.

Henderson, Jamima S., private nurse, Spring Lake, N. J.
 Jones, Bertie L., private nurse, Harrisburg, Pa.
 Nicholas, Beatrice E., private nurse, Baltimore, Md.
 Proctor, Eva M., private nurse, Newark, N. J.
 Robinson, Alice E., private nurse, Hartsville, S. C.
 Reynolds, Agnes, private nurse, Ironton, Ohio.

1909.

Allen, Irene P. (Mrs. Martin), deceased.
 Burnett, Sarah L., private nurse, Washington, D. C.
 Coates, Nana E., Battle Creek, Mich.
 Curtis, Minnie M., private nurse, Marietta, Ohio.
 Green, Lillian C., private nurse, Washington, D. C.
 Hall, Anita B., private nurse, Baltimore, Md.
 Hankle, Areatha B. (Mrs. Bailey), St. Louis, Mo.
 Johnson, Lillian A., private nurse, Poughkeepsie, N. Y.
 Lewis, Charlotte M., private nurse, Atlanta, Ga.
 Parker, Mary E., private nurse, Williamsport, Pa.
 Sheppard, Emma D., private nurse, Meyersdale, Pa.
 Smith, Annie M., private nurse, Jacksonville, Fla.
 Spears, Lillian, private nurse, Providence, R. I.
 Wainwright, Melinda E., Charlestown, W. Va.

1910.

Amby, Grace, married, Baltimore, Md.
 Brown, Nellie V., private nurse, Meyersdale, Pa.
 Everett, Sankey B., private nurse, Goldsboro, N. C.

Gates, Eugene J. P., private nurse, Washington, D. C.
 Gilliam, Octavia T., private nurse, Hanover, Va.
 Hutchinson, Mabel M., private nurse, Lockport, N. Y.
 Jackson, Sara E., private nurse, Steelton, Pa.
 Jordan, Maggie M., private nurse, Washington, D. C.
 McClaine, Nettie L. (Mrs. George), Paducah, Ky.
 Richardson, Lizzette S., private nurse, Washington, D. C.
 Reid, Marion M., private nurse, Wheeling, W. Va.

1911.

Blackburn, Clara E., married, Wheeling, W. Va.
 Clay, Eva Virginia, private nurse, Williamsport, Pa.
 Coates, Edna May, visiting nurse, Jacksonville, Fla.
 Green, Emily Estella, private nurse, Washington, D. C.
 Grisby, Sara Elizabeth, private nurse, Jacksonville, Fla.
 Harris, Florence M., private nurse, Brooklyn, N. Y.
 Hopkins, Jennie C., private nurse, New York City.
 Patton, Jessie Boyd, superintendent of nurses, Mercy Hospital, Nashville, Tenn.
 Piper, Ida J. (Mrs. Robinson), Boston, Mass.
 Price, Mae Irene, private nurse, Springfield, Mass.
 Stevens, Nettie Bentley, private nurse, Atlanta, Ga.
 Thompson, Lulu E., private nurse, Washington, D. C.
 York, Martella M., superintendent of nurses, St. Agnes Hospital, Raleigh, N. C.

Very respectfully,

THE SECRETARY OF THE INTERIOR.

W. A. WARFIELD,
Surgeon in Chief.

**REPORT OF THE PRESIDENT OF HOWARD
UNIVERSITY.**

613

OFFICERS OF THE UNIVERSITY.

BOARD OF TRUSTEES.

Chief Justice STANTON J. PEELLE, LL. D., *President*.
STEPHEN M. NEWMAN, D. D., *President of University*.
Dean GEORGE WM. COOK, *Secretary and Business Manager*.
Prof. EDWARD L. PARKS, *Treasurer and Registrar*.

Term expires 1912.

Justice THOMAS H. ANDERSON, LL. D., Washington, D. C.
Justice JOB BARNARD, LL. D., Washington, D. C.
Rev. F. J. GRIMKE, D. D., Washington, D. C.
Mr. CUNO H. RUDOLPH, Washington, D. C.
Mr. WILLIAM V. COX, A. B., Washington, D. C.
BOOKER T. WASHINGTON, LL. D., Tuskegee, Ala.
Mr. HENRY E. FELLEW, Washington, D. C.
Bishop BENJAMIN TUCKER TANNER, LL. D., Philadelphia, Pa.

Term expires 1914.

WILBUR P. THIRKIELD, D. D., New Orleans, La.
Mr. J. DOULL MILLER, New York City.
J. H. N. WARING, M. D., Washington, D. C.
MARCUS WHEATLAND, M. D., Newport, R. I.
Rev. J. E. MOORLAND, D. D., Washington, D. C.
CHARLES B. PURVIS, M. D., Boston, Mass.
Mr. JOHN T. EMLIN, Philadelphia, Pa.
Hon. J. C. NAPIER, LL. D., Washington, D. C.

Term expires 1915.

Rev. CHARLES WOOD, D. D., Washington, D. C.
Rev. CHARLES H. RICHARDS, D. D., New York City.
Justice GEORGE W. ATKINSON, LL. D., Washington, D. C.
Chief Justice STANTON J. PEELLE, LL. D., Washington, D. C.
JOHN R. FRANCIS, M. D., Washington, D. C.
Mr. HENRY W. HUBBARD, New York City.
Rev. CORNELIUS H. PATTON, D. D., Boston, Mass.

HONORARY BOARD OF TRUSTEES.

President WILLIAM HOWARD TAFT.
Bishop BENJAMIN F. LEE, Wilberforce, Ohio.
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PATRON EX OFFICIO.

The Secretary of the Interior, Hon. WALTER L. FISHER.

EXECUTIVE COMMITTEE.

STEPHEN M. NEWMAN, D. D., *President*.

Mr. WILLIAM V. COX.
Dr. JOHN R. FRANCIS.
Justice THOMAS H. ANDERSON.

Mr. CUNO H. RUDOLPH.
Dr. J. H. N. WARING.
Justice GEORGE W. ATKINSON.

HEADS OF DEPARTMENTS.

The College of Arts and Sciences: KELLY MILLER, A. M., *Dean*.
The Teachers' College: LEWIS B. MOORE, A. M., Ph. D., *Dean*.
The School of Theology: ISAAC CLARK, A. M., D. D., *Dean*.¹
The School of Medicine: EDWARD A. BALLOCH, A. M., M. D., *Dean*.
The School of Law: BENJAMIN F. LEIGHTON, LL. D., *Dean*.
The Commercial College: GEORGE WM. COOK, A. M., LL. D., *Dean*.
The Academy: GEORGE J. CUMMINGS, A. M., *Dean*.
The School of Manual Arts and Applied Sciences: PERRY B. PERKINS, A. M., Ph. D.,
Acting Director.

¹ Sustained entirely by endowments and special gifts. No doctrinal tests required.

REPORT OF THE PRESIDENT OF HOWARD UNIVERSITY.

HOWARD UNIVERSITY,
Washington, D. C., September 15, 1912.

SIR: I have the honor to submit for Howard University the following report, showing the condition of the institution on the 1st day of July, 1912, "embracing therein the number of pupils received and discharged or leaving the same for any cause during the year and the number remaining; also the branches of knowledge and industry taught and the progress made therein, together with a statement showing the receipts of the institution and from what sources, and its disbursements and for what objects."

REGISTRATION.

There were in attendance during the year 1,409 students from 37 States and 8 foreign countries. This number does not include 35 students who took work in the school of theology by correspondence. The number of students in the different departments was as follows:

College of arts and sciences.....	248
Teachers' college.....	139
School of theology.....	97
School of medicine.....	341
School of law.....	121
Academy.....	355
Commercial college.....	102
Students in music.....	75
Manual arts and domestic science.....	227
Total.....	1,700
Names duplicated because of students taking special courses in different departments.....	291
Correct total.....	1,409

Attention is called to the increase of numbers in the work of the college of arts and sciences, the teachers' college, and manual arts and domestic science, while in the professional schools the numbers are approximately the same as in the year preceding. This fact is to be considered in connection with the heightening of the requirements throughout the university. Quality of student work is sought for first of all.

The total number graduated was 218, distributed as follows:

School of theology (B. D.).....	27
School of medicine.....	36
School of dentistry.....	28
School of pharmacy.....	10
School of law.....	28
College of arts and sciences.....	31
Teachers' college.....	10
Domestic arts and domestic science.....	8
Normal course.....	4
Kindergarten.....	1
Academy.....	29
Commercial college.....	5
Music department.....	1

218

The record of usefulness on the part of graduates of Howard University is a very high one, and it is confidently hoped that the graduates of 1912 will not be an exception to the general rule.

The advances of the year include the inauguration in the college of arts and sciences of special courses in science leading to the degree of bachelor of science. The new science hall, with its thoroughly up-to-date equipment for laboratory work in physics, chemistry, and biology, and the largely increased teaching staff in the sciences, has made possible these courses, which are of the same grade with those in the leading universities of the land. There have also been inaugurated courses in civil, mechanical, and electrical engineering and architecture. The attendance on these courses shows that they are meeting a large demand.

TEACHERS.

It will be seen at once that the increasing number of students can not be properly treated by an inadequate number of teachers. The classes of the institution are becoming so large that division of them is necessary. Some steps have been taken to remedy this serious situation, but additional ones must be taken the coming year. This is the great vital need of the present condition of the university. The quality of the teaching force is rising in value every year. Many of the teachers spend their summers in studying at Harvard, the University of Chicago, and elsewhere in order to make themselves more fit for their work here. Some of them have more than a local reputation. Howard University can not hope to keep them unless adequate salaries are paid them, which is now not the case.

THE SCHOOL OF MEDICINE.

The high character of the work done in our medical department is well known. Attention is called again to the important extract, quoted last year, from the report of the committee on medical education presented at the annual meeting of the Louisiana State Medical Society, of which Dr. L. C. Le Beuf is chairman, on May 4, 1909, as follows:

The committee suggests that instead of the several smaller colored schools now struggling against insurmountable odds, some one or two central locations should be selected where prejudice is not so extreme and all means and energy be concentrated in building up one or two large, well-equipped universities, which with ampler means could obtain sufficient hospital advantages and better laboratory equipment. Medical education for colored students could then not only comply with the letter of the law, but also with the requirements of modern medicine. Negro education should be encouraged in medicine, as the 9,000,000 negroes of the South have a right to have physicians of their own race treat them if they so desire. But they also have the right to expect that such physicians shall have had a thorough training in high-grade medical colleges.

Attention is called also to the following extract from the report of the Carnegie Foundation for the Advancement of Teaching:

Of the medical schools in Washington, Howard University has a distinct mission—that of training the negro physician—and an assured future. The

Government has to some extent been the patron of the institution, and has done its medical department an incalculably great service by the erection of the Freedmen's Hospital. Sound policy—educational as well as philanthropic—recommends that this hospital be made a more intimate part of Howard University so that its students may profit to the utmost by its clinical opportunities. Its usefulness as a hospital in its immediate vicinity will thereby be increased, and its service to the colored race at large will be augmented to the extent that it is used to educate their future physicians.

The health of both races is involved in the thorough training of these physicians who are to mold the physical life of 10,000,000 of their people.

This department greatly needs new buildings with accommodation for its large classes and adequate facilities for research laboratories. The roll of students for the year was as follows:

Seniors.....	55	Senior pharmaceutical.....	11
Juniors.....	52	Middle-year pharmaceutical.....	12
Sophomores.....	28	First-year pharmaceutical.....	24
Freshmen.....	35	Special students.....	4
Senior dental.....	34		
Middle dental.....	34	Total.....	341
First-year dental.....	52		

Of these 74 received degrees—36 in medicine, 28 in dentistry, 10 in pharmacy.

THE SCHOOL OF LAW.

The courses of study in the school of law are framed upon the basis of the best courses in other schools. It is the only one in the United States with adequate faculty and equipment open especially to the colored race. The requirements of the school are high and the success of its graduates is gratifying. The number for the last year was as follows:

Seniors.....	30
Middlers.....	25
Juniors.....	43
Specials.....	23
Total.....	121

Of these, 28 received degrees.

THE SCHOOL OF THEOLOGY.

The school of theology is supported in no degree by Congress, but through endowment and special gifts. It requires no doctrinal tests, is interdenominational, and welcomes all who are preparing for greater efficiency in moral and religious work.

The branches taught are the Scriptures in the original, the English Bible, biblical history and antiquities, systematic theology, church history, homiletics, Christian missions, pastoral theology, moral philosophy, natural theology, evidences of Christianity, elocution, rhetoric, and vocal music. There are three courses—a classical and an English day course and a night English course. Only those in the classical course study the Scriptures in the original.

Much good is done by guiding a large number through correspondence courses in cases where they can not attend the university.

The roll of students for the year was as follows:

Seniors.....	14
Middlers.....	16
Juniors.....	14
Specials.....	4
Postgraduates.....	3
	51
Evening institute:	
Fourth year.....	14
Third year.....	7
Second year.....	9
First year.....	16
	46
Total.....	97
Correspondence students.....	35

Of these, 4 received degrees, 13 received diplomas, and 10 received testimonials.

THE COLLEGE OF ARTS AND SCIENCES.

This department, corresponding to the regular college courses in all other institutions, has grown in efficiency until its work is now higher than ever. The program of study includes courses in astronomy, Bible, botany, chemistry, commercial geography, commercial law, economics, English language, English literature, ethics, French, geology, German, Greek, history, international law, Latin, logic, mathematics, pedagogy, philosophy, physics, political economy, psychology, sociology, Spanish, and zoology.

These courses are divided into (1) the arts group and (2) the science group. The science group has been arranged to meet the needs of those whose special tastes lie in this field as well as those looking forward to the pursuit of medicine, engineering, agriculture, and science teaching.

The roll of students for the year was as follows:

Postgraduates.....	1
Seniors.....	31
Juniors.....	33
Sophomores.....	66
Freshmen.....	102
Part-course students.....	10
Total.....	243

Of these, 31 received degrees.

THE TEACHERS' COLLEGE.

The aim of the department is to enable all its students to take the point of view necessary for the work of instruction. The practice school is the laboratory of the department. Members of the senior class give instruction one year as a part of their required training.

The following subjects are taught: Teachers' course in English, physiology, zoology, physiography, physics, nature study, history, gymnastics, Bible, elocution, psychology (elementary and descriptive), history of pedagogy, history of philosophy, ethics, philosophy of education, methods of teaching, and kindergarten methods.

The roll of students for the year was as follows:

Seniors.....	9
Juniors.....	17
Sophomores.....	27
Freshmen and first year.....	39
Part-course students.....	16
Normal students (2-year course).....	27
Graduate students.....	4
Total.....	139

Of these 23 received degrees and diplomas.

THE ACADEMY.

This department has been an important part of the university in its whole history in laying the foundation for higher work, to which so many of the students aspire and for which they are totally unfitted without the sound elementary training given here. The department has had teachers of rare excellence and has been lifted to a high rank. The course covers four years of study. In the junior year the subjects taught are: English composition, elementary rhetoric, ancient history, introductory Latin, the Bible, music, drawing, physiology; also manual training four hours a week. In the submiddle year: English history, English classics, physical geography, geometry, French or German, the Bible, and manual training, such as carpentry, printing, etc. In the middle year: Physics, chemistry, algebra, English classics, essays, mathematics, Latin, Greek, German or French, the Bible as literature, essays, and discussions during the year.

The roll of students for the year was as follows:

Seniors.....	23
Middlers.....	60
Submiddlers.....	92
Juniors.....	151
Special students.....	29
Total.....	355

Of these 29 received diplomas.

THE SCHOOL OF MANUAL ARTS.

This department is increasing in efficiency and is becoming closely adjusted to the work of the teachers' college and the academy. Instruction in manual arts broadens the training given in the more literary studies of the academy and is indispensable in the teachers' college because of the increasing demand for teachers who can teach classes in manual training, domestic science, and domestic arts. The students of the first two years in the academy and of the first year in the commercial college are required to take training in this department.

The subjects taught are free-hand and mechanical drawing, wood-work, sheet-metal work, printing, sewing, cooking, weaving, basketry, garment making, millinery, and cookery. The courses are open to all students of the university.

The enrollment in all branches was 227.

THE COMMERCIAL COLLEGE.

The commercial college trains the students in a knowledge of the fundamental studies of business life, with great emphasis upon the common English branches of reading, spelling, grammar, and arithmetic. There are large classes in stenography and typewriting.

The following branches are taught: Higher English, mathematics, stenography and typewriting, physics, bookkeeping, political economy, civics, commercial law, commercial geography, sociology, zoology, physiology, statistics, and history of commerce.

The roll of students for the year was as follows:

Fourth-year class.....	5
Third-year class.....	86
Second-year class.....	28
First-year class.....	21
Special students.....	12
Total.....	102

Of these, 5 received diplomas.

COURSES IN MUSIC.

In music courses there has been a gratifying development during the past year. The amount of teaching for the year makes it necessary to employ additional teachers for the coming year. In addition to instruction in voice, piano, violin, harmony and history of music, there are a choral society, an orchestra, a glee club, and a choir, all of which have one or more rehearsals weekly throughout the year. The students numbered 75, of whom 1 received a diploma.

NEEDS.

The student body is becoming so large that the proper handling of classes and the control and discipline of all members makes it imperative that the university should have a large assembly hall, an additional dormitory for young men, and a music building for the increasing work of that department which can not be carried on in the other buildings.

RESIGNATION OF PRESIDENT.

Rev. Wilbur P. Thirkield, D. D., who has been president of the university for six years, having been elected bishop of the Methodist Episcopal Church last May, presented his resignation to the trustees to take effect June 30, 1912. On June 28, Rev. Stephen M. Newman, D. D., was elected by the trustees to serve as president and he immediately assumed the duties of the office.

REPORT OF TREASURER.

The financial statement for the year accompanies this report. The accounts are kept in a most scrupulous way, and the countinghouse methods are of the most modern type.

S. M. NEWMAN,
President.

The SECRETARY OF THE INTERIOR.

APPENDIX.

FINANCIAL REPORT.

Expenditure of appropriation for maintenance, fiscal year ended June 30, 1912.

Administration:		
President	\$4, 400. 00	
Secretary, dean of commercial college, and professor...	2, 250. 00	
Treasurer and professor of economics and political science.....	2, 250. 00	
		\$8, 900. 00
College of arts and sciences:		
Dean and professor of mathematics.....	1, 760. 00	
One professor of biology.....	1, 650. 00	
One professor of history.....	1, 650. 00	
One professor of English.....	1, 650. 00	
One professor of Latin, in part.....	1, 485. 00	
One professor of chemistry.....	1, 150. 00	
One professor of electrical engineering, in part.....	950. 00	
One professor of physics, in part.....	945. 00	
One professor of ethics, in part.....	450. 00	
One associate professor of biology.....	1, 400. 00	
One acting professor of German, in part.....	990. 00	
One instructor in French.....	1, 375. 00	
One instructor of nature study, in part.....	800. 00	
One instructor of English, in part.....	607. 50	
		16, 862. 50
Teachers' college:		
Dean and professor of pedagogy, in part.....	1, 944. 00	
One associate professor of mathematics, in part.....	1, 350. 00	
One instructor in practice teaching, in part.....	1, 260. 00	
One instructor in methods, in part.....	900. 00	
One instructor in English, in part.....	765. 00	
One instructor in history, in part.....	643. 50	
		6, 862. 50
Academy:		
Dean and professor of Greek, in part.....	1, 584. 00	
One assistant professor of mathematics, in part.....	1, 305. 00	
One instructor in English.....	1, 100. 00	
One instructor in chemistry, in part.....	810. 00	
One instructor in German, in part.....	810. 00	
One instructor in Latin, in part.....	765. 00	
Two instructors in English, \$450 and \$765, in part.....	1, 215. 00	
		7, 589. 00
Commercial college:		
Dean and professor of commercial law (also secretary).....		
One instructor in bookkeeping, in part.....	810. 00	
One instructor in shorthand and typewriting, in part...	675. 00	
One instructor in English, in part.....	585. 00	
One instructor in mathematics, in part.....	480. 00	
		2, 550. 00
Music courses:		
One director and instructor in vocal music, in part...	855. 00	
One instructor in piano, in part.....	450. 00	
One instructor in violin, in part.....	335. 00	
		1, 640. 00
Bookkeeper, in part.....	952. 31	
Superintendent of buildings and grounds, in part.....	900. 00	
Engineer, in part.....	824. 94	
Librarian, in part.....	810. 00	
Two clerks, \$600 each.....	1, 200. 00	
Preceptress, in part.....	585. 00	
Cataloguer, in part.....	540. 00	
Assistant librarian, in part.....	540. 00	

School of law:

Dean and lecturer on contracts, constitutional law, and statutory law.....	\$1,300.00	
One lecturer on pleading and practice.....	1,300.00	
One lecturer on torts, crimes, and misdemeanors and corporations.....	1,200.00	
One lecturer on evidence, personal property; also librarian.....	1,500.00	
One lecturer on insurance, executors and administrators, and instructor of pleading and practice.....	700.00	
One lecturer on law of domestic relations, commercial paper, and real property, in part.....	643.75	
		\$6,643.75
Total.....		
		57,400.00

Expenditure of appropriation for manual arts and applied sciences.

One director of manual arts.....	\$1,100.00	
One director of mechanical engineering.....	450.00	
One instructor in woodworking.....	1,200.00	
One instructor in domestic arts.....	1,100.00	
One instructor in domestic science.....	1,100.00	
One instructor in printing.....	1,000.00	
One instructor in mechanical drawing.....	1,000.00	
One instructor in forging.....	279.80	
One janitor.....	129.60	
		\$7,359.40
Equipment.....		4,331.07
Supplies.....		1,809.53
		13,500.00

Expenditure of appropriation for natural-history studies and laboratories.

Chemical laboratory.....	\$647.63	
Biological laboratory.....	728.09	
Physics laboratory.....	624.28	
		2,000.00

Expenditure of appropriation for repair of buildings and improvement of grounds.

Repair of buildings.....	\$3,688.92	
Improvement of grounds.....	1,311.08	
		5,000.00

Expenditure of appropriation for books.

Academic library books.....	\$1,150.00	
Law library books.....	350.00	
		1,500.00

Expenditure of appropriation for fuel and light.

Coal and wood.....	\$3,400.00	
Gas and electricity.....	100.00	
		3,500.00

Expenditure of appropriation for school of medicine.

Equipment and apparatus.....	\$3,746.17	
Laboratory supplies.....	6,253.83	
		10,000.00

Distribution of expenditures from Government appropriations.

Appropriation.	Amount.	Expenditures.	
		Current fund.	Permanent plant fund.
Disbursed through chief disbursing clerk of the Interior Department:			
Salaries.....	\$57,400.00	\$57,400.00	.....
Department of manual arts.....	13,500.00	9,168.93	\$4,331.07
Libraries; equipment, books, etc.....	1,500.00	413.49	.....
Law.....			202.70
Academic.....			793.81
Improvement of grounds and repair of buildings.....	5,000.00	5,000.00	.....
School of medicine; equipment and laboratory supplies.....	10,000.00	3,746.17	6,253.83
Laboratories; apparatus and material.....	2,000.00	1,262.18	747.82
Fuel and light.....	3,500.00	3,500.00	.....
Total credited permanent fund account.....			12,419.23
Total credited current fund.....		80,480.77	
Total appropriation.....	92,900.00	92,900.00	

General summaries for fiscal year ended June 30, 1912.

CURRENT FUND.

Total income for current expenditure for year.....	\$145,194.34
Total current expenditure.....	144,714.49
Net surplus current fund for year.....	479.85
Expenditure for permanent plant where there were no special funds.....	1,816.93
Net decrease of current fund.....	1,337.08

PERMANENT FUND.

Total income for increase of educational plant.....	\$13,024.04
Total expenditure for increase of educational plant, not including amount charged current fund.....	12,505.03

SUMMARY OF ABOVE.

Income as above.....	\$158,218.98
Expenditure as above.....	159,036.45

SUMMARY OF ALL INCOME AND EXPENDITURE.

Income as above.....	\$158,218.98
Additional income from dormitories.....	\$5,560.01
Additional income from boarding hall.....	16,747.15
	22,307.16
Total income for all purposes.....	180,526.14
Expenditure as above.....	159,036.45
Expenditure for dormitories.....	\$5,560.01
Expenditure for boarding hall.....	16,747.15
	22,307.16
Total expenditure for all purposes.....	181,343.61

HOWARD UNIVERSITY.

SOURCES OF INCOME.

Donations	\$3,419.02
United States Government appropriation	92,900.00
Income from endowments	13,853.42
From students	49,389.64
Miscellaneous	1,071.18
Less scholarships and gratuities to students	160,613.26
Total income as above	158,218.98
Income as above	158,218.98
Additional from students for dormitories	\$5,580.01
Additional from students for boarding hall	18,747.15
	22,307.16
Total	180,526.14

Balance sheet, June 30, 1912.

CURRENT FUND.

Assets:	
Accounts receivable	\$20,771.91
Due from endowment funds	1,094.28
Supplies	1,937.17
Prepaid insurance	557.98
Total current assets	24,361.34
Liabilities:	
Notes payable	6,000.00
Accounts payable	569.19
Due to land funds	75.62
Student accounts prepaid	555.47
Total current liabilities	7,200.28
Surplus of current assets	17,161.06
	24,361.34

PERMANENT FUND.

Investment assets:	
Securities	\$168,726.00
Productive real estate	114,687.49
	\$283,413.49
Cash—	
For investment special fund	2,570.99
For investment land fund	3,910.44
	6,481.43
Unproductive land	108,612.00
School of medicine students' aid loan fund in hand of treasurer.	
secretary of school of medicine	420.00
Due from current funds	75.62
Total investment assets	399,002.63

Endowment funds, etc.:

Mortgages against investments.....		\$1,000.00
Endowment capital accounts—		
Funds for general purposes.....	\$150,972.42	
Funds for designated purposes.....	180,846.79	
		281,819.21
Land fund (unrestricted fund).....		112,598.15
Medical students' aid and loan fund.....		1,242.57
Unexpended balance of permanent-plant funds.....		1,748.42
Total endowment funds.....		397,908.35
Balance due to current funds.....		1,004.28
		399,002.63

EDUCATIONAL PLANT, LANDS, BUILDINGS, AND EQUIPMENT.

Balance, July 1, 1911.....	\$1,265,244.18
Additions during year ended June 30, 1912.....	14,238.32
	1,279,482.50
Deduction due to revaluation of equipment.....	4,497.22
Total educational plant.....	1,274,985.28
Educational plant capital fund:	
Surplus income expended upon lands, buildings, and equip-	
ment.....	1,274,985.28

Income and expenditures, current fund, fiscal year ended June 30, 1912.

INCOME.

Income from students:

College of arts and sciences, teachers' college, commercial college and academy: Incidental and matriculation fees.....	\$8,440.67
College of arts and sciences and academy laboratory fees.....	784.60
School of theology: Incidental and matriculation fees.....	432.25
School of law: Tuition, matriculation, and graduation fees.....	3,460.00
School of medicine: Tuition, matriculation, graduation, and laboratory fees.....	32,308.64
Library fees.....	1,066.00
Music department: Tuition and practice fees.....	1,643.50
For dormitories (net).....	602.13
For dining hall (net).....	526.14
For book store (net).....	15.71
	\$49,369.64

Income from investments of—

Endowments for general purposes (net).....	7,416.25
Endowments for designated purposes.....	6,437.17
	13,853.42

Income from United States appropriation: Appropriation for current expenses.....

(Total appropriation of the Government was \$92,900.)	80,480.77
---	-----------

Gifts as per donor's list:

For general purposes.....	340.00
For designated purposes.....	2,540.00
	2,880.00

Income from other sources:

Chapel collections	\$195. 07
Interest	192. 25
Post office	24. 75
James F. Bundy, rent	800. 00
Miscellaneous	292. 72
	<u>\$1, 004. 79</u>

147, 588. 62

Less amounts given students in scholarships and gratuities

2, 394. 28

(This amount is not available for expenditure except when it comes back in fees, in which case it is included in the above.)

Income as above

158, 218. 98

Additional from students for dormitories

6, 560. 01

Additional from students for boarding hall

16, 747. 15

23, 807. 16

181, 526. 14

EXPENDITURE.

Departmental expenses:

College of arts and sciences, teachers' college, commercial college and academy	49, 079. 81
School of manual arts and applied sciences	9, 342. 02
School of theology	5, 517. 75
School of law	3, 373. 52
School of medicine	

Expense paid from school's income \$35,970. 73

Heat, water, and repairs not paid

from school's income 2, 672. 81

38, 643. 54

Carnegie Library 4, 071. 90

Music department 2, 312. 89

\$117, 942. 33

Administration and general expenses:

Salaries of president, secretary, treasurer, and auditor	7, 075. 00
Salaries of assistants, stenographers, etc.	4, 219. 14
Heat, light, and water	696. 87
Telegraph and telephone	423. 87
Printing and stationery	636. 24
Postage	312. 90
Traveling	424. 47
Advertising	517. 90
Insurance	405. 79
Publication expenses	1, 387. 88
Other general expenses	559. 14
	<u>16, 659. 20</u>

Maintenance of plant:

Salaries	3, 877. 75
Repairs and renewals	4, 349. 25
Care and improvement of grounds	2, 127. 20
	<u>9, 854. 20</u>

144, 455. 73

Interest 258. 76

144, 714. 49

Expenditure as above.....		\$144, 714. 49
Additional for dormitories.....	\$8, 560. 01	
Additional for boarding hall.....	16, 747. 15	
		<u>23, 807. 16</u>
		168, 021. 65

Income from permanent plant fund for year ending June 30, 1912.

Donations, as per donors' list:		
Alumni gymnasium fund.....	\$525. 00	
History department equipment.....	14. 02	
		<u>\$539. 02</u>
Appropriation of the United States Government for increase of educational plant and equipment:		
Manual arts department equipment.....	4, 381. 07	
Books and equipment for Carnegie Library.....	793. 81	
Books for law library.....	292. 70	
School of medicine equipment.....	6, 253. 83	
Academic laboratories equipment.....	747. 82	
		<u>12, 419. 23</u>
From income Smith textbook fund.....		2. 16
Interest:		
Alumni gymnasium fund.....	56. 65	
History department equipment fund.....	4. 15	
Howard memorial fund.....	. 64	
Medical building fund.....	2. 79	
		<u>64. 23</u>
Total income.....		18, 024. 64
Unexpended balances July 1, 1911:		
Alumni gymnasium fund.....	1, 083. 00	
History department equipment fund.....	77. 85	
School of medicine building fund.....	55. 70	
Howard memorial fund.....	12. 76	
		<u>1, 228. 81</u>
		14, 253. 45

Expenditure from permanent plant fund for year ended June 30, 1912.

Manual arts department equipment.....	\$4, 381. 07	
Carnegie Library:		
Books.....	\$783. 87	
Equipment.....	12. 60	
		<u>796. 97</u>
School of law, library books.....	292. 70	
School of medicine equipment.....	6, 253. 83	
Academic laboratories equipment.....	747. 82	
		<u>\$12, 421. 39</u>
Alumni gymnasium fund expenses.....		75. 24
History department equipment-fund expenses.....		8. 40
Total expenditure.....		<u>12, 505. 03</u>
Unexpended balances June 30, 1912:		
Alumni gymnasium building fund.....	1, 539. 41	
School of medicine building fund.....	58. 49	
History department fund.....	87. 12	
Howard memorial fund.....	13. 40	
		<u>1, 748. 42</u>
		14, 253. 45

Endowment funds, with income.

Names of funds.	Principal.	Income.
Scholarship aid.....	\$19,511.32	\$1,020.57
Lincoln memorial prize scholarship.....	700.00	35.00
Thaddeus Stevens professorship.....	2,200.00	110.00
Law professorship.....	10,010.00	500.50
Crebel professorship.....	2,460.00	122.50
Whittier professorship.....	875.00	43.75
Martha Spaulding.....	8,538.26	441.41
J. P. Thompson scholarship.....	280.00	13.00
Edward Smith textbook.....	500.00	25.00
Hartford reading room.....	425.00	21.25
Mary B. Patton scholarship.....	1,200.00	60.00
Francis B. Schoals scholarship.....	6,000.00	300.00
Stone professorship of theology.....	40,000.00	1,900.00
Wm. E. Dodge scholarship.....	8,900.00	445.00
Frederick Douglass scholarship.....	8,803.11	440.15
J. K. McLean scholarship.....	1,000.00	50.00
Orange Valley Church scholarship.....	1,000.00	50.00
Horace Ford scholarship.....	1,000.00	50.00
Thomas Cropper Riley scholarship.....	1,000.00	50.00
Wm. W. Patton scholarship.....	1,000.00	50.00
Wm. W. Patton memorial professorship.....	1,000.00	50.00
John W. Alvord scholarship.....	12.10	.61
Pomeroy scholarship.....	2,500.00	125.00
Caroline Patton Hatch.....	200.00	10.00
Alumni professorship.....	25.00	1.25
School of Theology alumni.....	40.00	2.00
School of Medicine (transferred from endowment funds for general purposes).....	15,000.00	750.00
Normal (commercial) department aid.....	107.00	2.68
Total.....	130,346.79	6,437.17

RECAPITULATION.

Funds.	Principal.	Income.
Students' aid funds.....	\$55,649.69	\$2,802.31
Professorship funds.....	55,572.10	2,673.61
School of Medicine funds.....	15,000.00	750.00
Students' scholarship funds.....	3,200.00	160.00
Smith textbook fund.....	500.00	25.00
Hartford reading-room fund.....	425.00	21.25
Total for designated purposes.....	130,346.79	6,437.17
Endowment funds for general purposes.....	150,972.42	7,416.25
Total.....	281,319.21	13,853.42

**REPORT OF THE SUPERINTENDENT OF THE UNITED
STATES CAPITOL BUILDING AND GROUNDS.**

REPORT OF THE SUPERINTENDENT, UNITED STATES CAPITOL BUILDING AND GROUNDS.

OFFICE OF SUPERINTENDENT,
UNITED STATES CAPITOL BUILDING AND GROUNDS,
October 8, 1912.

SIR: The long session of Congress during the fiscal year 1912 prevented a number of desirable improvements to the Capitol. Therefore the work during this year was limited to practically ordinary repairs. The number of items total 981, details and costs of which will be found in the files of this office. In this report I set out, therefore, only the most important.

THE CAPITOL.

There have been installed in the kitchens of the House and Senate restaurants two refrigerating machines of 4 tons capacity each. This work included rebuilding the ice boxes, the installation of new boxes of large capacity and the pipe and pipe covering incident thereto.

The heating and ventilating departments throughout the building were completely overhauled and a number of steam traps of an improved type installed to meet the new conditions incident to the furnishing of steam from the new Capitol Power Plant. The elevators throughout the building were completely overhauled and new cables furnished wherever required. An additional dining room has been fitted up in connection with the Senate restaurant, which adds materially to the accommodation of the Senators.

The House restaurant has been fully remodeled. The steam table, counters, and other fixtures hitherto occupying the center of the large room were removed to an adjacent room, the openings in the floor filled in, the marble floor continued, all of which has added a large amount of space to the main dining room and resulted in increased accommodations. An additional dumb-waiter has been put in, adding materially to the quickness of service. In connection with this, the fixtures in the kitchen were rearranged and new plumbing installed. Twelve collapsible doors have been installed at the various entrances of the restaurant. These doors, which are of a flexible grating type, provide much needed ventilation.

The clerk's document room of the House has been moved to the House Office Building and the House barber shop dismantled and removed to the room formerly occupied by the clerk's document room. The room vacated was refitted and added to the House restaurant.

The stationery room of the House was removed to the House Office Building and the vacated room fitted up and turned over for the use of the assistant doorkeepers.

In the Senate wing mahogany doors have been placed at the entrances of the room of the Committee on Manufactures and the room

adjoining. Additional doorway has been provided for the Committee on Foreign Relations, joining the principal room of the committee to the adjacent room added for their use. Doorways have been provided in connection with the new dining room of the Senate between the dining room and pantry and between the pantry and corridor.

In the Senate wing the following committee rooms were painted or frescoed: Indian Affairs, Finance, Foreign Relations, Interoceanic Canals, Manufactures, Patents, Transportation and Sale of Meat Products, and Printing. Also the following: Two private rooms northeast corner, gallery floor, the Senate restaurant and kitchen, telegraph office, barber shop, employees' barber shop, stationery room, and elevator shafts. The usual touching up to the Senate Chamber, President's room, and the office of the Secretary of the Senate was done.

In the House wing the following painting and decorating was done: Room of Committee on Appropriations, Elections No. 2, Ways and Means, office of the whip of the House, lobby and cloakrooms of the House, office of the Sergeant at Arms, press gallery, and various corridors of the House.

Owing to the extent in area of the skylights over the building, many repairs are required annually. In a sense, the same thing may be said of the sanitary appointments of the building and the plumbing connected therewith. All these repairs have been kept up and these two features are in good condition.

In the Supreme Court section all the necessary repairs have been made to the heating and ventilating apparatus, and the Supreme Court Chamber, conference room, robing room, corridors around the court, and some smaller rooms painted.

The policy already partially carried out, of installing new lighting fixtures of a type particularly suited to the character of the Capitol, has been carried out during the past fiscal year by the installation of crystal type fixtures in nine special rooms where new fixtures were required.

A large amount of electrical work has been done throughout the building, many new mains run, many old mains replaced, all of which were of the character incident to the domestic occupation of the building.

The Capitol Power Plant has, during the past year, justified its construction and maintenance. Heat, light, and power have been furnished to the Capitol, Senate and House Office Buildings, and Library of Congress with one brief interruption during the entire season. It has proved an economical proposition. As is known, this plant is under the supervision of the House Office Building Commission, and to that commission I submit in a special report all of the details not gone into here.

The Senate Office Building, under the Senate Committee on Rules, has been taken care of and maintained in satisfactory manner.

The same may be said of the House Office Building, under the supervision of the House Office Building Commission. Reports in detail are submitted to the two governing bodies named, which secure the appropriations in each case necessary for the maintenance of the building.

CAPITOL GROUNDS.

The lawns have been liberally fertilized, reseeded, rolled, properly cut, and kept in very good condition during the past season. A great deal of pruning and cutting out of dead branches and treatment and spraying of the trees and shrubbery has been done. A number of young trees have been planted to replace those destroyed by storms. The severe cold of last winter destroyed a large amount of foliage and shrubbery. Much of this was located in important places. It has been necessary to cut the shrubbery back in order, if possible, to obtain a new growth. Fertilization and working of the soil to assist the revival of the shrubbery has been done. The drives and walks have been repaired, and sewers and traps kept in as good condition as possible, considering the present state of the sewerage lines within the limits of the grounds. Plantings at the east and west fronts of the Capitol and on the terraces have been kept in good condition and with satisfactory appearance during the year.

The large court of the Senate Office Building was graded and seeded to form a new lawn. In the center of the court was constructed a fountain 50 feet in diameter, the basin of which is constructed with reenforced concrete. This work included the necessary supply and waste mains.

ENGINE HOUSE AND SENATE AND HOUSE STABLES.

The entire equipment of stalls in the Senate engine house and stables was kept in first-class repair throughout the year. An addition has been built to the shed in the rear of the stables, approximately 40 by 20 feet in area, and floored with concrete. All necessary repairs to buildings, including plumbing, have been made, and painting done wherever needed. In this connection, a new cast-iron main sewer has been put in.

COURTHOUSE, WASHINGTON, D. C.

The following repairs have been made to this building in the order set forth:

Room 22, ceiling renewed and room painted; jury room, 21, painted; register of wills, room 52, plastered, wainscoted, and painted, one new washstand installed; toilet for women, room 5, concrete floor laid, two new toilets installed, painted; district attorney's toilet room, new concrete floor laid, three new toilets, two basins, two urinals and partition installed, painted; Judge Anderson's room, partition removed, room redecorated; new toilet placed in court yard, with fixtures; room 29, Judge Stafford, new Georgia pine floor laid and painted; room 45, cell room, remodeled for superintendent of building, with concrete floor, and painted; room 44, laborers, remodeled, concrete floor laid, painted; room 48, general guard room, concrete floor laid, painted; room 50, cell room for toilet, concrete floor laid, new toilet installed; room 46, ice room, concrete floor laid, painted; two doorways bricked up; large brick room built in court for attorneys' consulting room, concrete floor laid, plastered; doors and windows, painted; room 25, public toilet, new toilet and basin installed, painted; criminal courts Nos. 1 and 2, painted.

New electrical work has been installed in all cells and guardroom of basement and in public toilets in place of gas. All necessary repairs to roofs were made. The basement story of the interior was whitewashed. Four rooms formerly occupied as lunch rooms were remodeled for use of recorder of deeds, concrete floors installed and the rooms wainscoted, plastered, and painted.

UNITED STATES BOTANIC GARDENS.

The superintendent of the gardens reports to this office the following repairs for the fiscal year:

One new heating boiler with necessary steam pipes was installed. Two old boilers were enlarged. Three boilers were repaired and put in good condition. Twelve plant houses were repaired, necessary glazing done, and painted. One new basin was installed in the lodge of the superintendent and all needed repairs to plumbing made.

The expenditures made in connection with the gardens are under the supervision of the Joint Committee on the Library.

EXPENDITURES.

Expenditures for the fiscal year ended June 30, 1912, were as follows:

Expenditures, fiscal year 1912.

Capitol Building and repairs, 1912:

Pay rolls.....	\$15, 135. 79
Labor vouchers.....	902. 25
Machinery and ironwork.....	1, 942. 08
Brooms, brushes, sponges, soap.....	416. 42
Lumber and millwork.....	2, 185. 96
Hardware.....	751. 92
Lime, brick, cement, sand.....	285. 99
Paint, oil, and glass.....	1, 601. 28
Stone and marble work.....	1, 170. 86
Flags.....	59. 76
Drawing material, blue-print paper, etc.....	145. 08
Office vehicle.....	800. 81
Hauling, telegrams, expressage.....	22. 64
Plumbing and plumbing material.....	2, 935. 41
Elevators and repairs.....	822. 86
Roofing and tin work.....	821. 43
Painting and decorating.....	233. 02
Tile and tiling.....	951. 40
Repairs to ranges.....	176. 25
Models and plaster.....	11. 20
Stationery and books.....	117. 54
Legislative bell service.....	167. 49
House restaurant equipment.....	202. 00
Traveling expenses.....	78. 45
Miscellaneous.....	90. 61
Reserved for unpaid bills.....	1, 471. 50
	33, 500. 00

Appropriated:

Sundry civil act approved Mar. 4, 1911.....	\$30, 000. 00
Deficiency act approved Aug. 26, 1912.....	3, 500. 00

33, 500. 00

Improving Capitol grounds, 1912:

Pay rolls.....	22, 255. 07
Labor vouchers.....	2, 154. 94
Plants and seeds.....	169. 60
Fertilizers.....	1, 809. 81

Improving Capitol grounds, 1912—Continued.

Tools and machinery	\$232.37
Brushes, brooms, etc.	286.74
Squirrel food	364.00
Soil and sod	5,226.50
Sand, cement, lime, and gravel	961.28
Plumbing and plumbing material	458.03
Hardware	228.53
Paving and repairs	773.33
Freight and express	329.61
Hose and couplings	441.90
Lumber	233.17
Motor and hand mowers	271.80
Miscellaneous	140.50
Removing snow	945.80
Travel expenses	85.80
Reserved for unpaid bills	131.22
	37,000.00

Appropriated:

Sundry civil bill approved Mar. 4, 1911	\$30,000.00
Urgent deficiency bill approved July 21, 1911	7,000.00
	37,000.00

Capitol power plant, 1912:

Pay rolls and vouchers	70,513.97
General office supplies and expenses	225.26
Power-plant building	374.74
Miscellaneous power-plant equipment	300.57
Turbines and motor generators	5.75
Switchboards and equipments	83.20
Boilers and stokers	2,749.76
Coal and ash handling equipment	32.53
Miscellaneous steam equipment	118.95
Storage-battery equipment	.33
Pumping-station waterway	21.00
Steam transmission and tunnel	3.60
Electric transmission, ducts, etc.	1.86
Electric apparatus and accessories	251.13
Wire and material	2,146.42
Fixtures	4,016.00
Incandescent and arc lamps	7,501.00
Hauling, express, telegrams, etc.	124.72
Contingent	67.71
Gas and electric current	1,441.91
Reserved for unpaid bills	18.55
	90,000.00

Appropriated, sundry civil bill approved Mar. 4, 1911

90,000.00

Engine house, Senate and House stables, 1912:

Pay rolls	437.34
Labor vouchers	88.00
Lumber and millwork	424.76
Ironwork	63.99
Brick, sand, and cement	92.31
Tin and roof work	145.75
Plumbing and material	27.09
Hardware	35.64
Paint, oil, and glass	175.53
Reserved for unpaid bills	9.50
	1,500.00

Appropriated, sundry civil bill approved Mar. 4, 1911

1,500.00

Repairs to courthouse, District of Columbia, 1912:

Pay rolls	\$2, 801. 49
Labor vouchers.....	636. 25
Office supplies and expenses.....	71. 07
Painting and decorating.....	916. 69
Plumbing and material.....	1, 926. 68
Electric work and material.....	249. 91
Brick, sand, and cement.....	467. 88
Lumber and millwork.....	651. 51
Hardware.....	105. 31
Tinning and roof work.....	150. 17
Heating and ventilating work.....	1, 793. 94
Iron and metal work.....	228. 74
Reserved for unpaid bills.....	. 36

10, 000. 00

Appropriated, sundry civil bill approved Mar. 4, 1912..... 10, 000. 00

Respectfully submitted.

ELLIOTT WOODS,

Superintendent U. S. Capitol Building and Grounds.

The SECRETARY OF THE INTERIOR.

**REPORT OF THE ACTING SUPERINTENDENT OF THE
YELLOWSTONE NATIONAL PARK.**

637

REPORT OF THE ACTING SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
YELLOWSTONE NATIONAL PARK,
OFFICE OF SUPERINTENDENT,
Yellowstone Park, Wyo., October 1, 1912.

SIR: I have the honor to submit annual report of the condition of affairs in and the management of the Yellowstone National Park from October 15, 1911, to the present date.

GENERAL STATEMENT.

The Yellowstone National Park, set aside by act of March 1, 1872 (secs. 2474 and 2475, R. S., 17 Stat., 32), is located in the States of Wyoming, Montana, and Idaho. It has an area of about 2,142,720 acres, and an average altitude of about 8,000 feet.

The military force available for duty in the park consists of one squadron of cavalry and a machine-gun platoon containing the normal quota of officers and an enlisted strength increased by 75 men. The headquarters is located at Fort Yellowstone, but the command also garrisons 15 soldier stations scattered throughout the park, requiring 200 men during the tourist season and from 75 to 100 during the remainder of the year.

A telephone system connects the soldier stations and the post.

In addition to the military force which is maintained by the War Department, the Interior Department furnishes certain civilian employees, namely, a clerk, scouts, a buffalo keeper, etc.

During the past season two officers of the command, who were selected as specially fitted for the work, were kept constantly in the park, going from one station to another and having general supervision over the work of the enlisted men in their respective districts. In addition, frequent inspections were made by myself, troop commanders, and other officers. The medical officers stationed at Fort Yellowstone made frequent sanitary inspections of hotels, camps, etc., throughout the park, and one of them was stationed at the lake outlet during the greater part of the summer, to look after the health of the men on station and others in the upper park. The results have been most excellent; the strenuous duties required of the enlisted men serving on station, including the hard work of opening the roads for the tourist season, repairing bridges and culverts, and keeping them in a passable condition until late in the summer, when the Engineer Department could secure necessary funds, have been cheerfully and conscientiously performed.

The regular appropriations by Congress for the construction and maintenance of roads, bridges, etc., in the reservation are expended by the War Department under the direction of the Chief of Engineers. The lack of funds prevented any work under that department until after July 1, and then the amounts allotted were so small that little material good was accomplished during the tourist season, and the condition of the roads was bad. There was no sprinkling of roads beyond Mammoth Hot Springs.

TRAVEL.

During the winter and spring large detachments of troops were used to keep the road open between the Mammoth Hot Springs and Gardiner, Mont., at the northern entrance. A large earth slide in Gardiner Canyon required frequent cleaning out to keep the road passable, and even then it was at times dangerous for teams to pass and always very uncertain as to when it might be completely blocked. As no funds were available to fix it before the opening of the tourist season, in order to make sure of some way of getting travel in from Gardiner, the department allotted \$500 from park revenues for repairing the old trail back of Mammoth Hotel leading to Gardiner, and this was expended in widening the trail and repairing bridges. The trail was put in such condition that wagons could get over it in case of necessity, and it was so used on many occasions during the summer.

The repairing of this trail was essential for use of saddle and pack animals coming in from Gardiner, as the regulations prohibit them from traveling over the main road during the tourist season.

While not in the best condition, the roads on the main belt line in the park, and the approaches from the two main entrances at Gardiner on the north and Yellowstone on the west were open for travel at the beginning of the season, June 15. The road from Cody on the east, which passes over a high divide, was not open until June 26, and that over the top of Mount Washburn and through Dunraven Pass on July 10.

The aggregate number of persons making park trips during the season of 1912 was as follows:

Travel during the season of 1912.

Yellowstone Park Transportation Co., entering via northern entrance.....	5,392
Monida & Yellowstone Stage Co., entering via western entrance.....	5,144
Holm Transportation Co., entering via eastern entrance.....	209
Others at hotels, traveling with private or Government transportation, bicyclists, foot travelers, etc.....	475
Wylie Permanent Camping Co.:	
Entering via northern entrance.....	2,582
Entering via western entrance.....	3,351
Entering via eastern entrance.....	69
	6,002
With other licensees of personally conducted camping parties.....	2,232
Making park trips with private transportation as "camping parties".....	3,285
Total number making park trips.....	22,739
Number making short trips with special licensees.....	231
Grand total of travel season of 1912.....	22,970

The Yellowstone Park Boat Co. reports that 3,305 people took the boat trip across Yellowstone Lake during the season, of which 25 were government officials on duty and carried free. This company failed to keep their records in such shape that they could state how many of those taking the lake trip were traveling by the various methods of transportation through the park, but give the total only.

Travel by the different entrances.

From the north, via Gardiner, Mont.....	10,788
From the west, via Yellowstone, Mont.....	10,184
From the south, via Jackson Hole.....	573
From the east, via Cody, Wyo.....	1,430
Total.....	22,970

The Wylie Permanent Camping Co. was authorized to maintain an additional lunch station camp near Sylvan Lake, for the accommodation of such of their patrons as desired to enter the park via the eastern or Cody route, and report that 69 of their tourists came in that way during the season. After the experience of one season the company has decided that this camp should be located near the border of the park at the eastern entrance, and has made request for authority to change it before the opening of another season.

The Wylie Permanent Camping Co. had 104 vehicles of various sorts in use during the season. Special licenses were issued for conducting movable camping parties, covering the use of 141 wagons and 302 saddle and pack animals and for 6 wagons for special livery work.

The Holm Transportation Co. of Cody, Wyo., was granted a concession to conduct a regular transportation business in the park, entering from the Cody or eastern side, and reports having taken 209 tourists on regular trips through the park during the season.

In order that tourists so desiring might have an opportunity to return to Mammoth from the Grand Canyon via Mount Washburn, the concession of the Monida & Yellowstone Stage Co. was extended to include this trip, and this company was authorized to make an extra charge of \$7.50 for the service. A site was granted for building near Tower Falls, a stable for relays of horses and a log bungalow where tourists taking the trip could enjoy the luncheon brought along from the Canyon Hotel. Eighteen tourists made this trip during the season.

ROADS.

In compliance with Senate resolution No. 275, April 2, 1912, an estimate was prepared and submitted to Congress, through the War Department, of the cost of new roads or changes in the present roads in the Yellowstone National Park in order to permit of the use of automobiles and motor cycles therein without interfering with the present mode of travel in vehicles drawn by horses or other animals. A copy of this estimate, as submitted, together with all correspondence in connection therewith, may be found in Senate Document No. 871, Sixty-second Congress, second session. In this estimate, it was recommended, by Capt. C. H. Knight, Corps of Engineers, who is locally in charge of road work in the park, that in

case automobiles and motor cycles are to be granted the use of park roads that the present roads be reconstructed at an estimated cost of approximately \$2,265,000, in order to provide a single system of roads for automobiles, motor cycles, and vehicles drawn by horses and other animals. As a result, the sum of \$77,000 was included in the sundry civil bill, approved August 24, 1912, for widening and improving surface of roads, and for building bridges and culverts, from the belt-line road to the western border; from the Thumb Station to the southern border; and from the Lake Hotel Station to the eastern border, all within Yellowstone National Park, to make such roads suitable and safe for animal-drawn and motor-propelled vehicles. It is understood that this work of widening and improving, which will be commenced under the small appropriation referred to above, is to be extended over several seasons, thus giving the present stage and transportation lines operating in the park an opportunity to prepare for the advent of automobiles.

This work, as well as the regular repairs and improvements to the roads in general throughout the park for which \$100,000 was appropriated by the same act, is in charge of Capt. C. H. Knight, United States Engineer Corps, who has furnished the following notes on the work under his department since the date of my last report:

Owing to the appropriation being exhausted, practically all improvement work was suspended early in September, 1911.

On July 3, work of removing slides of earth from the road between Gardiner and Mammoth Hot Springs was resumed; a crew of 20 laborers, 10 teams, and 1 foreman continued the work until August 5, when the crew was sent to the divide to repair the roads and bridges between the Upper Basin and Thumb Station.

On August 9 a crew of 12 men and 2 teams began work of improving the sprinkler operations in the park.

A crew of 41 men is working with 10 teams on the east road between the belt line of the main circuit and the east boundary, widening the road, putting in new culverts and repairing culverts.

A crew of 37 men and 10 teams is working on the west road between the belt line of the main circuit and the west boundary.

A crew consisting of 3 carpenters, 8 laborers, and 1 team is engaged in redecking bridges.

A crew of 12 men and 8 teams is at work filling in the approaches to the steel bridges put in last year.

A crew of 12 men and 3 teams is at work replacing worn out, and erecting concrete, piers for steel bridges.

A crew of 12 men and 3 teams is at work on the Cooke City road replacing culverts and bridges and filling in washouts.

Owing to the fact that the appropriation for this work was not available until August 24, 1912, sprinkling was carried on only around Mammoth Hot Springs between July 3 and September 15, and between Mammoth Hot Springs and Gardiner September 3 to 15.

FISH.

The subhatchery maintained by the Department of Commerce and Labor on Yellowstone Lake was in charge of Mr. W. T. Thompson, the superintendent of the United States hatchery at Bozeman, Mont., who has furnished me with the following notes on his operations in the park during the season of 1912:

Prompted by the splendid success of the work of the season of 1911 when over 20,000,000 eggs were secured, the bureau built two 20-foot motor boats and a 16-foot rowboat, and purchased a speed launch to do duty as a scout, and also added to the capacity of the plant so that a larger number of eggs could be handled. Twenty-eight million five hundred and thirty-nine thousand five hundred eggs were taken from Yellowstone Lake and tributaries, the larger portion of these coming from Cub and Clear Creeks on the east side of the lake. One man was again sent to Soda Butte, where he took 781,000 eggs from Trout Lake, bringing the total for the season up to 29,320,500.

Five million one hundred and sixty-seven thousand green spawn, and 15,954,000 eyed eggs were shipped to various parts of the country, the larger shipments going to the near-by States. Montana hatcheries including the United States hatchery at Bozeman received approximately 6,250,000; Wyoming Fish Commission 2,000,000, the United States hatchery at Spearfish, S. Dak., 3,250,000; the various State, national, and local hatcheries in Colorado, 10,000,000, and large assignments were shipped to the States of Washington and Oregon. Two small shipments were sent to the aquariums at Battery Park, N. Y., and Belle Isle, Detroit, for exhibition and educational purposes. Large numbers were planted in Yellowstone Lake and small streams adjacent; 50,000 in Duck Lake, 300,000 in Grebe Lake, and 850,000 in De Lacy Creek.

Twenty-six thousand fingerling brook trout (*fontinalis*) were furnished for the park from the United States hatchery at Bozeman, Mont., during the month of July, and of these 3,000 were planted in Blacktail Deer Creek, 16,000 in Glen Creek, and 7,000 in a small lake near Sepulchre Mountain that has never before been stocked with fish of any kind.

WILD ANIMALS.

The past winter was an ideal one so far as game was concerned. The grass was plentiful on the range, and while there was much snow, no crust formed on it, so it was an easy matter for the elk, deer, antelope, etc., to get plenty to eat.

ANTELOPE.

While the experiment of last year of capturing antelope and shipping them to other ranges was successful, it resulted in disturbing the herd, and suggestions received during the past year for similar transfers have, in the interest of the herd, been discouraged.

During the past winter this herd was exceedingly restless, and required the almost constant attention of one scout and an enlisted man to keep the antelopes from leaving the park. The fence along the north line would not hold them, and they seem to care but little for the hay that was put out for them in the vicinity of Gardiner, as the grazing was excellent all winter, and partially on account of the large herds of elk that frequented their feeding grounds. The herd numbered about 500 last winter, and the condition of the animals was most excellent, as was that of all of our wild animals.

The field near the northern entrance that last year produced about 80 tons of wheat hay, was plowed, cultivated, and in the spring sowed

to alfalfa with oats as a nurse crop. The latter has been cut, cured as hay, and stacked for winter use of the game, yielding about 100 tons of excellent hay. The young alfalfa plants are in fine condition, and experts that have inspected the field believe that it has a good stand of alfalfa and will yield a good crop of hay next year.

DEER.

For some unaccountable reason, only about one-half of our fine herd of black-tailed deer returned to their winter range in the vicinity of Fort Yellowstone last fall. No knowledge was had of any unusual slaughter of deer anywhere in the vicinity of the park, although it was reported unofficially that they were quite numerous and tame in the Flathead country in western Montana, several hundred miles from the park, and that hunters had little difficulty in getting the number allowed by law during the open season. Those that did come back were in splendid condition, and scarcely any died during the winter. Four hundred were counted, but as they were scattered over a much larger area than usual, due to the splendid grazing, it was not an easy matter to find all of them. The white-tailed deer still number about 100—ranging mostly within a few miles of Fort Yellowstone, and are in excellent condition.

Both varieties are exceedingly tame.

ELK.

During last April an approximate accurate census was taken of the elk that winter along the northern border of the park. Twenty-seven thousand eight hundred and one animals were counted inside of the park, and 2,300 were observed just outside and therefore belonging to the same herd, making a total of 30,101 that actually belonged to the winter herd of the park. In summer these animals go back into the high mountains in the interior of the park and but few of them are seen by travelers, and many of the herd that winters in Jackson Hole south of the park also come into the park for the summer.

Under authority of the department elk were captured in the park, in pens at the haystacks near Gardiner, Mont., loaded on stock or freight cars and shipping to other ranges as follows: One carload of 60 to Snohomish County, Wash., on March 8; one car of 46 to Skagit County, Wash., on March 18; and the third carload of 31 animals was shipped to Glacier National Park on March 29. The county commissioners paid all expense of capture and shipment of those sent to Washington, the first carload costing them \$10 per head delivered on the cars at Gardiner, and the second one \$7 per head. Those shipped to Glacier National Park were captured and loaded by park scouts assisted by enlisted men.

The State of Montana captured five carloads of elk just outside of the park 2 miles west from the northern entrance, and shipped them to points in western Montana, where they were turned loose to replenish the range.

While a few animals were lost in shipping, the experiment is considered a very successful one, and it is believed that with this experience future captures can be made at less expense and the shipments conducted with but little loss of life.

The problem of handling this large herd of elk to the best advantage of all concerned has become an important one, and one in which many are interested. The Department of Agriculture has, in the interests of the elk, limited the grazing districts for sheep in the National Forests adjoining the park; the States of Montana and Wyoming have set aside game preserves adjoining the park for the protection of the elk and other game; and the latter State as well as the Federal Government has spent money to feed the elk that winter in Jackson Hole.

Members of the United States Biological Survey, Department of Agriculture, and members of the United States Forest Service, who are actively engaged in studying the elk situation, called at my office to discuss the matter on September 9, 1912, and the following points were unanimously agreed upon and recommended:

1. That the whole elk problem should be handled as a unit.
2. That for the present the elk herd of about 50,000, which includes the park herd, the Jackson Hole herd, and those that range in the forest reserves just outside the park, should be maintained at its present size, of which the northern herd should not exceed 35,000.
3. That under present conditions the annual crop from the herd (killed under game laws of the adjoining States, shipped, etc.), should not exceed 7,500 to 8,000.
4. That some equitable arrangement be made whereby the people of the State of Montana may derive their due proportion of the benefits of the herd.
5. That for the present the existing sheep grazing lines on the Gallatin National Forest be maintained.
6. That so far as elk are concerned, the present lines on the Absaroka National Forest (Jardine-Slough Creek trail) are reasonable and should be maintained.

It is believed that with proper supervision, and cooperation on the part of all parties interested, this herd will become a valuable asset. About 600 elk were killed in the State of Montana near the park line during the last few days of the open hunting season last fall, many of them going to families that otherwise might have had a slim meat ration for the winter due to dull times for workingmen in this section of the country.

MOOSE.

Moose are often seen by scouts and patrols traveling in remote portions of the park. They appear to be in first-class condition, and are believed to number about 550 within the limits of the park.

BUFFALO.

WILD HERD.

A special effort was made during the month of July to determine as nearly as possible the exact number of buffalo in the wild herd in the park. Forty-nine animals, including 10 this year's calves, were counted. This is the largest number reported for more than 10 years, and the number of calves indicates that the herd is thriving beyond expectation.

If practicable to do so without disturbing them too much, it is thought advisable to capture some of the calves next spring, and rear them with the tame herd, thus introducing new blood.

TAME HERD.

At the present time there are 143 animals in this herd, 58 males, 61 females, and 24 this year's calves, sex undetermined.

A disease attacked the herd in December, just after the buffalo were taken up from the range where they had been day-herding during the summer, and 22 died before it could be stopped. The Department of Agriculture sent a veterinarian to the park to do what he could, and after examination of specimens from the dead animals sent to that department in Washington the disease was pronounced to be hemorrhagic septicemia, although its symptoms were at first thought to be those of black-leg. The carcasses were burned and all precautions taken to prevent further spread of the disease. In June a veterinarian was sent out by the Department of Agriculture, who vaccinated all of the adults of the herd with serum prepared and furnished by his department, as a protective measure.

In addition to the 22 animals that died of disease, 2 bulls and 4 cows have died or had to be killed for various causes during the year. These, however, were of but little loss to the herd, as they were old or decrepit animals and unfit to remain with the herd.

By constant herding during the summer the herd has become used to being driven, and as a rule is handled with but little trouble on the range. The usual show herd of 15 bulls was brought in to the field near the Mammoth Hot Springs at the beginning of the tourist season, so they could be seen by travelers, and was returned to the main herd on September 18.

Much difficulty has been experienced in harvesting the hay for the buffalo this season, due to almost daily rains, but the crop was a good one and about 200 tons of hay has finally been put in stack, which will be ample for the needs of the herd during the winter. About 15 acres of hitherto almost worthless land, located under the irrigation system at the corrals, have been harrowed and sowed to timothy. About 16 acres in the same field, too rough to irrigate without plowing, has been broken and will be left until next spring so that the heavy sod may rot, when it will be harrowed and sowed to oats to be cut for hay, and eventually sowed to timothy.

There are altogether too many bulls in the herd, and some advantageous means of disposing of the surplus should be found.

BEAR.

Bears are plentiful, and during the summer it has been necessary to have seven killed at different times, to prevent injury and damage to property.

The bears are a continual source of interest to tourists, as they may be seen every day feeding at the dumps of the hotels and camps.

Under authority of the department, the following have been captured and shipped to city parks for exhibition purposes, in each case the expense of capture and shipment having been borne by the parks to which the animals were sent: Male and female black bears on June 27; male and female brown bears on August 11; female grizzly on June 18 and another on September 15, and a male grizzly on August 17—seven in all to the city of Boston, Mass. Male and female

grizzlies to Milwaukee, Wis., for the Washington Park Zoological Society, on August 17 and September 25, respectively. A female grizzly with two cubs to the city park at Memphis, Tenn., on August 18, and a male grizzly to the Zoological Society of St. Louis, Mo., on September 25. The latter city desires a female grizzly, and it is expected we shall be able to secure one before winter sets in.

COYOTES.

Two hundred and seventy coyotes have been destroyed, by poisoning, trapping, and shooting in the park during the past year, by authorized parties, and indications are that there are many left. It is claimed that gray wolves have been heard and that their tracks have been seen in the park, but up to this time none have ever been killed, and there is no absolute proof that they exist within the limits of the reservation, though they have been taken not many miles outside on the cattle ranges in Montana.

MOUNTAIN SHEEP.

The mountain sheep that usually spend most of the winter on Mount Everts and in Gardiner Canyon were more or less scattered last winter, owing to the weather conditions and the abundance of natural feed, although a few could be seen daily along the road between Fort Yellowstone and Gardiner. Some of the band that usually winters in the park were seen several miles outside in the game preserve adjoining the park on the northwest in the State of Montana. All were in fine condition and wintered well. Two hundred and ten were counted last spring.

BEAVER.

Numerous evidences of the workings of these interesting animals are found in all waters of the park, and they are occasionally observed late in the afternoon at work on their dams or houses.

OTHER ANIMALS.

Mountain lions, lynx, foxes, otter, and the smaller varieties of fur-bearing animals are found, as are also many varieties of birds, including waterfowl.

Wire netting with half-inch mesh has been placed over the lower part of Stygian Cave, at the extreme upper or southern end of the Mammoth Hot Springs, as it was found that many song birds of various species stopped there in stormy weather or for the night, especially during the migratory season in spring and fall, and were overcome and killed by the poisonous gases.

PROTECTION OF GAME.

Evidences of poaching within the limits of the park are few. With the cooperation of the game authorities of the adjoining States, and with their game preserves extending up to the park line for many miles along the most important habitats of the game, the matter of protection is considerably simplified. During the open season for hunting big game in Montana in the fall of 1911, in two cases on the

west and one on the north, parties hunting elk were found over the line and were arrested, brought in and tried before the United States commissioner, and paid the penalty of the law. In each case they plead ignorance of the whereabouts of the line.

TRAILS.

Owing to lack of funds, no new firelanes or trails were constructed during the past year. Forty-eight miles of additional firelanes are needed for adequate protection from forest fires and for advantageous systematized work in patrolling the park borders. This item was included in my estimate of funds for the coming fiscal year.

FOREST FIRES.

The agreement entered into on August 14, 1912, between the Departments of the Interior, Agriculture, and War, for the prevention and suppression of forest fires occurring along the park boundary, will be of advantage to both the park and the national forests adjoining. On account of heavy rains that have fallen during the past summer, there has been no danger from forest fires at any time; but as these conditions are not likely to recur another season, all preparations for carrying into effect an efficient system of fire patrols in connection with the rangers in charge of the forests adjoining the park, before the season for forest fires again arrives, are contemplated. Steps have already been taken to secure a good supply of fire-fighting tools.

Little difficulty was had during the past tourist season with camping parties leaving their fires burning when the camps were abandoned.

TELEPHONE LINES.

The War Department has completed a new independent line from Fort Yellowstone to Norris, this part of the line having heretofore been attached to the poles of the hotel company. This makes the War Department line throughout the park an independent one, with the exception of that part from Norris to Lake Outlet via Canyon, and from the Firehole Junction to Riverside Station, which will be built as soon as practicable. An additional station was built during the summer on the park line on Crevice Mountain, east from Gardiner, Mont., and a telephone line will be built to connect it with the Gardiner Soldier Station when practicable.

SANITATION.

Two men with a single team and wagon have been employed constantly during August and September in going over the regular tourist routes and cleaning camps, digging holes for garbage, caring for the earth closets that are maintained at points convenient for the use of the public, and doing such general cleaning up as was required to keep the park in a sightly and sanitary condition. While all lessees in the park are required to keep their premises in a sanitary condition and camping parties are required to carefully police their camps before abandoning them, yet there is a necessity for work of this kind, as the bears dig up the refuse from the pits provided for

the camps, the pits become full and must be covered with earth and new ones provided, lunch boxes and loose papers are strewn along the road, and there is always plenty of work to keep two men busy. This system of cleaning has resulted in a much better general appearance throughout the park, and it is contemplated keeping it up hereafter during three months of the year—July, August, and September.

IMPROVEMENTS UNDER THE WAR DEPARTMENT.

A fine new chapel building, built of native stone, is in process of construction at Fort Yellowstone and will be completed and the furniture installed within a few weeks.

A new post hospital that was begun in 1909 will be completed and ready for occupancy some time during the coming winter.

A pipe line of concrete for conducting the water for the post system from mouth of Panther Creek to Golden Gate, has just been completed.

RECOMMENDATIONS.

That it be decided for a definite period of time by the department maintaining the military force and that controlling the national park if the park shall continue to be policed by United States troops or if they shall in the near future be replaced by a civilian organization. A fixed policy in this regard is essential to a stable and progressive administration.

Very respectfully,

L. M. BRETT,
Lieutenant Colonel, First Cavalry,
Acting Superintendent.

THE SECRETARY OF THE INTERIOR.

APPENDIX.

RULES AND REGULATIONS OF MAY 27, 1911.

Washington, D. C., May 27, 1911.

The following rules and regulations for the government of the Yellowstone National Park are hereby established and made public, pursuant to authority conferred by section 2475, Revised Statutes, United States, and the act of Congress approved May 7, 1894:

1. It is forbidden to remove or injure the sediments or incrustations around the geysers, hot springs, or steam vents; or to deface the same by written inscriptions or otherwise; or to throw any substance into the springs or geyser vents; or to injure or disturb, in any manner, or to carry off any of the mineral deposits, specimens, natural curiosities, or wonders within the park.

2. It is forbidden to ride or drive upon any of the geyser or hot spring formations, or to turn stock loose to graze in their vicinity.

3. It is forbidden to cut or injure any growing timber. Camping parties will be allowed to use dead or fallen timber for fuel. When felling timber for fuel, or for building purposes when duly authorized, stumps must not be left higher than twelve inches from the ground.

4. Fires shall be lighted only when necessary and completely extinguished when no longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

5. Hunting or killing, wounding, or capturing any bird or wild animal, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed in the park under other circumstances than prescribed above, will be forfeited to the United States, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation, and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof. On arrival at the first station of the park guard parties having firearms, traps, nets, seines, or explosives will turn them over to the sergeant in charge of the station, taking his receipt for them. They will be returned to the owners on leaving the park.

6. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent of the park in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

7. No person will be permitted to reside permanently or to engage in any business in the park without permission, in writing, from the Department of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion, and no pack trains shall be allowed in the park unless in charge of a duly registered guide.

8. The herding or grazing of loose stock or cattle of any kind within the park, as well as the driving of such stock or cattle over the roads of the park, is strictly forbidden, except in such cases where authority therefor is granted by the Secretary of the Interior. It is forbidden to cut hay within the boundaries of the park excepting for the use of the wild game, and such other purposes as may be authorized by the Secretary of the Interior or the park superintendent.

9. No drinking saloon or barroom will be permitted within the limits of the park.

10. Private notices or advertisements shall not be posted or displayed within the park, except such as may be necessary for the convenience and guidance of the public, upon buildings on leased ground.

11. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who violate any of the foregoing rules, will be summarily removed from the park, and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

12. It is forbidden to carve or write names or other things on any of the mileposts or signboards, or any of the platforms, seats, railings, steps, or any structures or any tree in the park.

Any person who violates any of the foregoing regulations will be deemed guilty of a misdemeanor, and be subjected to a fine as provided by the act of Congress approved May 7, 1894, "to protect the birds and animals in Yellowstone National Park and to punish crimes in said park, and for other purposes," of not more than \$1,000, or imprisonment not exceeding two years, or both, and be adjudged to pay all costs of the proceedings.

INSTRUCTIONS OF JUNE 6, 1911.

1. The feeding, interference with, or molestation of any bear or other wild animal in the park in any way by any person not authorized by the superintendent is prohibited.

2. *Fires.*—The greatest care must be exercised to insure the complete extinction of all camp fires before they are abandoned. All ashes and unburned bits of wood must, when practicable, be thoroughly soaked with water. Where fires are built in the neighborhood of decayed logs, particular attention must be directed to the extinguishment of fires in the decaying mold. Fire may be extinguished where water is not available by a complete covering of earth, well packed down.

Especial care should be taken that no lighted match, cigar, or cigarette is dropped in any grass, twigs, leaves, or tree mold.

3. *Camps.*—No camp will be made at a less distance than 100 feet from any traveled road. Blankets, clothing, hammocks, or any other article liable to frighten teams must not be hung at a nearer

distance than this to the road. The same rule applies to temporary stops, such as for feeding horses or for taking luncheon.

Many successive parties camp on the same sites during the season, and camp grounds must be thoroughly cleaned before they are abandoned. Tin cans must be flattened and, with bottles, cast-off clothing, and all other débris, must be deposited in a pit provided for the purpose. When camps are made in unusual places where pits may not be provided, all refuse must be hidden where it will not be offensive to the eye.

4. *Bicycles*.—The greatest care must be exercised by persons using bicycles. On meeting a team the rider must stop and stand at side of road between the bicycle and the team—the outer side of the road if on a grade or curve. In passing a team from the rear the rider should learn from the driver if his horses are liable to frighten, in which case the driver should halt and the rider dismount and walk past, keeping between the bicycle and the team.

5. *Fishing*.—All fish less than 8 inches in length should at once be returned to the water with the least damage possible to the fish. No one person shall catch more than 20 fish in one day.

6. *Dogs*.—Dogs are not permitted in the park.

7. *Grazing animals*.—Only animals actually in use for purposes of transportation through the park may be grazed in the vicinity of the camps. They will not be allowed to run over any of the formations, nor near to any of the geysers or hot springs; neither will they be allowed to run loose within 100 feet of the roads.

8. *Formations*.—No person will be allowed on any formations after sunset without a guide.

9. *Hotels*.—All tourists traveling with the authorized transportation companies, whether holding hotel coupons or paying cash, are allowed the privilege of extending their visit in the park at any of the hotels without extra charge for transportation. However, 24 hours' notice must be given to the managers of the transportation companies for reservations in other coaches.

10. *Driving on roads of park*.—(a) Drivers of vehicles of any description, when overtaken by other vehicles traveling at a faster rate of speed, shall, if requested to do so, turn out and give the latter free and unobstructed passageway.

(b) Vehicles in passing each other must give full half of the roadway. This applies to freight outfits as well as any other.

(c) Racing on the park roads is strictly prohibited.

(d) Freight, baggage, and heavy camping outfits on sidehill grades throughout the park will take the outer side of the road while being passed by passenger vehicles in either direction.

(e) In making a temporary halt on the road for any purpose all teams and vehicles will be pulled to one side of the road far enough to leave a free and unobstructed passageway. No stops on the road for luncheon or for camp purposes will be permitted.

(f) In rounding sharp curves on the roads, like that in the Golden Gate Canyon, where the view ahead is completely cut off, drivers will slow down to a walk. Traveling at night is prohibited except in cases of emergency.

(g) Transportation companies, freight and wood contractors, and all other parties and persons using the park roads will be held liable for violation of these instructions.

(h) Pack trains will be required to follow trails whenever practicable. During the tourist season, when traveling on the road and vehicles carrying passengers are met, or such vehicles overtake pack trains, the pack train must move off the road not less than 100 feet and await the passage of the vehicle.

(i) During the tourist season pack animals, loose animals, or saddle horses, except those ridden by duly authorized persons on patrol or other public duties, are not permitted on the coach road between Gardiner and Fort Yellowstone.

(k) Riding at a gait faster than a slow trot on the plateaus near the hotels where tourists and other persons are accustomed to walk is prohibited.

(l) Mounted men, on meeting a passenger team on a grade, will halt on the outer side until the team passes. When approaching a passenger team from the rear, warning must be given, and no faster gait will be taken than is necessary to make the passage, and if on a grade the passage will be on the outer side. A passenger team must not be passed on a dangerous grade.

(m) All wagons used in hauling heavy freight over the park roads must have tires not less than 4 inches in width. This order does not apply to express freight hauled in light spring wagons with single teams.

11. *Liquors*.—All beer, wine, liquors, whisky, etc., brought into the Yellowstone National Park via Gardiner to be carried over the roads through the reservation to Cooke City, must be in sealed containers or packages, which must not be broken in transit.

12. *Miscellaneous*.—Automobiles are not permitted in the park.

Persons are not allowed to bathe near any of the regularly traveled roads in the park without suitable bathing clothes.

13. *Penalty*.—The penalty for disregard of these instructions is summary ejection from the park.

NOTICES.—(a) *Boat trip on Yellowstone Lake*.—The excursion boat on Yellowstone Lake plying between the Lake Hotel and the Thumb Lunch Station at the West Bay is not a part of the regular transportation of the park, and an extra charge is made by the boat company for this service.

(b) *Side trips in park*.—Information relative to side trips in the park and the cost thereof can be procured from those authorized to transport passengers through or to provide for camping parties in the park, also at the office of the superintendent.

(c) All complaints by tourists and others as to service, etc., rendered in the reservation should be made to the superintendent in writing.

CONCESSIONS.

Concessionaires holding contracts for privileges in the Yellowstone Park during the season of 1912, with rentals exacted therefor.

Yellowstone Park Hotel Co.:

Operation of hotels in the park under leases dated June 13, 1907, running for 20 years from March 20, 1905, covering sites aggregating 20 acres; rental \$300 per annum first 5 years, \$20 per acre per annum (\$400) thereafter. Lease dated November 5, 1907, for 18 years from March 20, 1907, covering sites aggregating 9½ acres, rental \$15 per acre per annum to March 20, 1910, and \$20 per acre per annum thereafter. Leases expire March 20, 1925.	Present annual rentals.
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Total acreage of sites occupied, 29½ acres, at \$20..... \$585.00

Yellowstone Park Hotel Co.—Continued.

Hotels and lunch stations with accommodations for guests at each as follows:	Present annual rentals.
Mammoth Hot Springs Hotel.....	350
Cottage Hotel.....	80
Norris Station.....	25
Fountain Hotel.....	350
Old Faithful Inn.....	400
Thumb Station, lunch only.....	
Lake Hotel.....	450
Canyon Hotel.....	350

Yellowstone Park Transportation Co.:

Operation of transportation and stage lines in the park. Leases as follows:

June 13, 1907, granting transportation privilege, 20 years, from March 31, 1905.

October 18, 1907, for 18 years, from March 31, 1907, of sites aggregating 20.95 acres in connection with privileges. Rental \$40 per acre per annum (\$838).

May 22, 1908, for 18 years, from March 31, 1907, covering 0.11 acre at Mammoth Hot Springs (addition to 9.78 acres under lease October 18, 1907, thereat), at \$40 per acre per annum (\$4.40).

December 31, 1908, 16 years, from March 31, 1909, for 7.1 acres at Grand Canyon, at \$40 per acre per annum (\$284). Leases expire March 31, 1925.

Total acreage, 28.16 acres, at \$40 per acre..... \$1, 126. 40

Yellowstone Park Boat Co. (transferees of the T. E. Hofer Boat Co.).

Privilege of operating system of pleasure and fishing boats on Yellowstone Lake, renting and selling fishing tackle, etc.:

Lease November 12, 1907, for 10 years, covering boat privilege. Rental, \$100 per annum.

Lease January 30, 1909, for 9 years, from November 12, 1908, covering 2-acre site on shore of lake, at \$40 per acre per annum; use of docks and ways, \$270 per annum; privilege of operating store for selling grain, hay, and other supplies, \$50 per annum.

Total charge per annum under above..... 500. 00

Monida & Yellowstone Stage Co.:

Operation of transportation and stage lines in the park.

Lease dated March 31, 1906, running for 10 years, covering sites aggregating 11 acres. Rental, \$25 per acre. April 27, 1910, rate increased to \$40 per acre per annum.

Lease dated July 29, 1912, running for 3 years and 10 months from July 1, 1912, covering sites aggregating 2 acres, at \$40 per acre per annum.

Leases expire March 31, 1916..... 520

Wylie Permanent Camping Co.:

Privilege of transporting passengers through the park and maintaining permanent camps in connection therewith. Lease dated May 4, 1906, running 10 years from March 31, 1906. Rental, \$10 per wagon (no less than 50 wagons to be used). Season of 1912, 104 wagons used, at \$10 each. Lease expires March 31, 1916.....

1, 040. 00

Holm Transportation Co.:

Operation of transportation and stage lines in the park. Agreement dated April 10, 1912, covering sites aggregating 1.79 acres, at \$40 per acre per annum.....

71. 60

Henderson & Lyall:

Privilege for store, dwelling, and post office. Lease dated August 7, 1905. Yearly rental, \$100 per annum (lease runs for period of 10 years). Lease expires August 7, 1915.....

100. 00

Pryor & Pryor:

Privilege for dwelling and store, including soda fountain, selling beverages, etc. Lease dated August 26, 1908; runs for period of 8 years from April 3, 1908; expires April 3, 1916. Yearly rental per annum, \$50. Rental is readjustable. Lease covers plat 13,800 square feet, occupied by dwelling and store.....

50. 00

Henry E. Klammer:

Lease of plat of ground (2 acres) at Upper Geyser Basin for dwelling and general store, dated January 31, 1908, for period of 10 years from June 1, 1907. Rental, \$100 per annum. Privilege reserved in lease to readjust rental at any time or charging for store privilege...	Present annual rentals. \$100. 00
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F. Jay Haynes:

Lease dated June 1, 1904, for 1 acre of ground at Upper Geyser Basin, for period of 10 years from March 31, 1904, for photographic privilege. Yearly rental, \$30 per annum. Lease dated June 1, 1904, for sixty-four one-hundredths of an acre at Mammoth Hot Springs; runs for period of 10 years from March 31, 1904; photographic privilege. Yearly rental, \$30. Leases expire March 31, 1914.....	60. 00
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Total of rentals under leases.....	4, 153. 00
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COOPERATIVE AGREEMENT BETWEEN THE DEPARTMENT OF THE INTERIOR, THE DEPARTMENT OF AGRICULTURE, AND THE DEPARTMENT OF WAR FOR THE PREVENTION AND SUPPRESSION OF FOREST FIRES OCCURRING ALONG THE BOUNDARIES OF THE YELLOWSTONE NATIONAL PARK.

This agreement, made this 14th day of August, 1912, by and between the Secretary of the Interior, the Secretary of Agriculture, and the Secretary of War,

Witnesseth: For and in consideration of the mutual promises and agreements hereinafter contained, to be kept and performed, in so far as possible and authorized by law, the said parties hereby promise and agree as follows:

1. This agreement shall extend and apply to the territory embraced within the Yellowstone National Park and the following national forests: Absaroka, Beartooth, Gallatin, Madison, Shoshone, Targhee, and Teton, provided that it may be extended to cover any national park and adjacent national forests upon the mutual consent of both parties hereto.

2. Each of the parties hereto agree to keep a vigilant lookout for forest fires along the boundary between the park and the national forests by means of patrolmen and other employees provided for under the appropriation for such department, and to promptly notify the nearest officer having charge of the territory of any fires observed.

3. Each of the parties hereto agrees to take immediate steps to suppress any fires which may be discovered on either side of and within a reasonable distance of the boundary between the park and any national forest, to continue fighting the fire until it is extinguished or until the proper officer within whose territory the fire is burning arrives and assumes charge, and thereafter to render every assistance compatible with the regular duties of employees of the department.

4. Whenever a forest fire occurs upon an area covered by this agreement which is under the jurisdiction of one of the departments concerned herein, and such fire is so located as to endanger another such area under the jurisdiction of another department, such other department agrees that its employees, voluntarily and upon request, will furnish to the department upon whose area such fire occurs any available food supplies, tools, men, transportation, or other equipment as may be needed in fighting such fires, provided: That no other department will be expected to render such assistance when such action would jeopardize the safety or seriously interfere with the proper administration of the territory under its jurisdiction.

5. It is mutually agreed that in so far as practicable the system of telephone lines, roads, and trails within the territory embraced in this agreement will be coordinated so as to be of the greatest use in the protection of the area from fire and that wherever possible the telephone lines of the park and the national forests will be connected so as to permit rapid communication.

6. It is mutually agreed that the officer in charge of the Yellowstone National Park and the supervisors of the several national forests will confer at such times and at such places as may be most convenient and will arrange a definite plan of cooperation; dividing the territory into protective units in accordance with the topography, means of communication, and accessibility, deciding the division of responsibility for the territory, the location and number of patrolmen, the improvement projects to be undertaken, and all other points essential to a clear-cut, fire-protective plan.

7. It is mutually agreed that any expenses incurred by either party to this agreement in carrying out the plan of action herein stated more properly chargeable to the appropriation for the other department, will be approved by the local officers representing either department, and a statement of such expenses forwarded to the proper officer at Washington, D. C., upon receipt of which the funds will be transferred between the appropriations for the departments through a Treasury settlement.

8. This agreement shall continue in force and effect until terminated by written notice from either party to the others: Provided, however, that the notice of termination of agreement must be given between the dates of November 1 of any year and April 30 of the following year.

In witness whereof, the hand and seal of the Secretary of the Interior, on the date first hereinbefore written, and the hand and seal of the Secretary of Agriculture, and the hand and seal of the Secretary of War, are hereto affixed this 14th day of August, 1912.

WALTER L. FISHER,
Secretary of the Interior.

JAMES WILSON,
Secretary of Agriculture.

H. L. STIMSON,
Secretary of War.



A topographic map of Wyoming, D. C., 1900.

**REPORT OF THE ACTING SUPERINTENDENT OF THE
YOSEMITE NATIONAL PARK.**

64213°—INT 1912—VOL 1—42

657

REPORT OF SUPERINTENDENT OF YOSEMITE NATIONAL PARK.

OFFICE OF THE SUPERINTENDENT,
Yosemite, Cal., September 30, 1912.

SIR: I have the honor to submit the following report of conditions and administration in the Yosemite National Park during the season of 1912:

GENERAL STATEMENT.

This park is situated in Tuolumne, Mariposa, and Mono Counties, Cal., and originally had an area of about 1,512 square miles. The lands embraced therein were set aside by act of Congress approved October 1, 1890 (26 Stat., 650), and were placed under the supervision of the Secretary of the Interior. By the act of February 7, 1905 (33 Stat., 702), and the joint resolution of June 11, 1906 (34 Stat., 831), the boundaries were changed, excluding a total of 555.94 square miles therefrom and including a total of 168.35 square miles not previously within the reservation, making the present area of 1,124.41 square miles, or 719,622.40 acres. The second change in boundaries included the recession of Yosemite Valley and Mariposa Big Tree Grove to the Federal Government.

The Yosemite Valley is open to travel all the year round, and while it is impracticable in the wintertime, because of the snow, to ascend any of the trails up to the rim of the valley, the principal roads on the floor of the valley are passable.

Troops C and D, First Cavalry, that had been on duty in the park during the season of 1911, were withdrawn on November 1, 1911, and on November 20, 1911, I returned to my station at the Presidio of San Francisco, leaving Mr. Gabriel Sovulewski, the supervisor, in immediate charge of the park.

On April 12, 1912, I returned to the park, to remain for the season, and on May 5, 1912, Troops C and D, First Cavalry, arrived in Yosemite Valley for protection duty during the season of 1912.

As soon as practicable detachments were stationed at Wawona, the Mariposa Big Tree Grove, Crane Flat, Merced Big Trees, Aspen Valley, Hog Ranch, Hetch Hetchy Valley, Lake Eleanor, Buck Creek, and Soda Springs, and a district was assigned to each detachment, which was provided with written instructions and a schedule of patrols to be made in its district.

As these troops had served in the park before, most of the soldiers were acquainted with the park and the duties required of them, and for this reason, and because there was a full complement of officers with them, the protective duty of the park has been more efficient and generally satisfactory this season than in any previous season since 1908.

GRAZING.

No sheep or stock have been herded through the park, but there has been considerable trouble with cattle and friction with cattle owners on the west side. These cattle owners all had grazing permits for the season from the forest supervisor of the Stanislaus National Forest, and each permit contained the following provision: "*Provided further*, That the animals shall not intrude upon any national park, and any such intrusion shall be sufficient cause for cancellation of this permit and denial of future grazing privileges."

Numerous trespasses of cattle owned by holders of grazing permits from the Forest Service were reported to the forest supervisor for appropriate action.

FIRES.

The vigilance of the troops prevented any serious forest fires in the park this season. Those that occurred were quickly discovered and quickly extinguished.

Camp Curry, in Yosemite Valley, was partially destroyed by fire on July 18, 1912.

GAME.

The deer, bear, grouse, and quail continue to increase.

FISH.

In July, 1912, about 35,000 lake trout from the Wawona hatchery were planted in Bridalveil Creek above the falls, 20,000 in Crescent Lake, 20,000 in Grouse Lake, and 30,000 in Ostrander Lake. On July 1, 1912, the streams in Yosemite Valley were opened for fishing and, although the limit of number was reduced to 20 and the limit of size increased to 8 inches, these streams were nearly exhausted of fish during the summer.

FENCES.

The proposed fence along part of the western boundary that was to be built at the joint expense of the Forest Service and cattle owners to prevent the trespassing of cattle on the park lands, has not yet been built.

The fence around the big tree "Grizzly Giant" in the Mariposa Grove has been built.

PATENTED LANDS.

The urgent recommendations of previous years that the Government extinguish the title to all patented lands in the park, is renewed.

There are approximately 20,000 acres of these lands, consisting of timber claims and a few claims that were taken up under the homestead act and were never occupied as homesteads, but simply used as a pretext for bringing in stock or cattle to stray upon the park lands. There are no persons now residing on patented lands within the park, except Mr. Kibby, at Lake Eleanor.

The timber claims are valuable and are increasing in value very rapidly. Perhaps the finest sugar pine timber in California lies within the park along the road from Wawona to Chinquapin, and most of it is on patented lands.

The Yosemite Lumber Co. has built a logging railroad from El Portal to near the park boundary in the vicinity of Chinquapin, and is now cutting timber there and shipping the logs to Merced Falls, where it has built a large sawmill. This company has also surveyed a route for continuing the logging railroad through the park to Alder Creek, where it claims the ownership of 6,000 acres of timberlands. The work of denudation in the vicinity of Chinquapin has already begun, and it is what will happen to the timber on all the patented lands in the park in the near future unless they are purchased by the Government.

This matter demands urgent attention. The necessity of preserving the forest in this portion of the park and of reducing the number of private claims to such an extent as would justify the Federal Government in purchasing the remaining claims was one of the main reasons that caused the Yosemite Commission of 1904 to recommend the reduction of the area of the park.

That commission, as has every other person who has been charged with the welfare of the park or with making any recommendations in regard to it, recommended that the Government immediately purchase and extinguish all private rights.

TELEPHONE SERVICE.

The telephone system connecting all the soldier outposts with the superintendent's office was, as usual, promptly repaired and placed in operation by the troops. The War Department has been very liberal in furnishing material and equipment for this system, which facilitates the administration and protection of the park.

The agreement with the Pacific Telephone & Telegraph Co., which, by permission of the department, has operated its lines from Yosemite Valley to the outside world by way of El Portal on condition that all Government messages, telephone or telegraph, should be transmitted free, was modified so as to provide that the company should pay an annual license fee to the Government and the Government would pay for the transmission of its telephone and telegraph messages.

ROADS.

There are about 141 miles of road in the park—the Coulterville road, 19 miles; the Big Oak Flat road, 10 miles; the Wawona-Glacier Point-Yosemite Valley road, 32 miles; the Tioga road, 45 miles; and the Government roads, about 35 miles, the latter comprising the roads on the floor of Yosemite Valley, the portion of the Yosemite-El Portal road lying within the park, and the roads in the Mariposa Big Tree Grove.

The Big Oak Flat, the Wawona-Glacier Point-Yosemite Valley, and the Tioga roads are toll roads. The status of the Coulterville road is not definitely known, recent information being to the effect that the franchise of that road has been extinguished. Full information about these toll roads is contained in the Report of the Yosemite Park Commissioners, Senate Document No. 34, Fifty-eighth Congress, third session.

GOVERNMENT ROADS.

The Yosemite Valley-El Portal road is the main highway into the park. The portion of this road between Pohono Bridge and the park boundary, about 10 miles, is still rocky, narrow, and tortuous, and it should be widened, straightened, regulated in grade, and metaled.

The portion of the Wawona road that belongs to the Government should be improved and sprinkled, and all the roads on the floor of the valley should be metaled, parts of them being relocated in order to follow more attractive routes, and the road between the village and Happy Isles, on the south side of the river, should be improved and sprinkled first, because of the preponderance of travel over it.

Because of the delay in the passage of the appropriation bill there has been no improvement work done on any of the park roads, but the necessary preliminary steps are in progress for beginning the work, and as much as possible will be done before winter weather makes further work impracticable until spring.

TRAILS.

A new trail branching off from the Mirror Lake-Tenaya Lake trail at Snow Creek was built to the North Dome, and thence to Yosemite Point, and also a new trail from Tenaya Lake to Clouds Rest, passing between Clouds Rest and Sunrise Mountain. All the old trails about Yosemite Valley were repaired and maintained in good condition during the season, and the following trails exterior to Yosemite Valley were repaired and improved:

Trails repaired and improved during season of 1912.

	Miles.
Pohono trail from Glacier Point to Fort Monroe.....	12
Lake Merced trail from its junction with the Sunrise trail to Lake Merced...	5
Clouds Rest trail from the top of Nevada Falls.....	5
Soda Springs trail from its junction with the Clouds Rest trail.....	14
Soda Springs trail via Lake Tenaya.....	15
Hetch Hetchy trail from Lake Tenaya to McGee Lake, Conness Creek, Virginia Canyon, Matterhorn Canyon, Benson Pass, Smedburg Lake, Rodgers Lake, Rodgers Meadows, Pleasant Valley, Rancheria, and Hetch Hetchy Valley	46
Smedburg Lake to Benson Lake.....	5
Hetch Hetchy Valley to Tiltill Valley.....	6
Tiltill Valley to Lake Vernon.....	7
Lake Vernon to Lake Laurel and Lake Eleanor.....	10
Lake Eleanor to Hetch Hetchy Valley.....	8
Hetch Hetchy Valley to Hog Ranch.....	12
Yosemite Point to Tioga road.....	5
Total	150

BRIDGES.

El Capitan Bridge over the Merced River near El Capitan is now in a precarious condition and if not replaced soon by a new one will have to be closed for travel, and the Tenaya Bridge over Tenaya Creek is in a similar condition. The bridge over Yosemite Creek near Camp Yosemite was replaced by a new one last fall. The bridge over the Tuolumne River in the Hetch Hetchy Valley partially destroyed last year by high water has not yet been repaired, and it will probably be advisable to build a new one better located.

CONCESSIONS.

The following concessions were held in the park during the period from November 1, 1911, to October 31, 1912:

Concessions, season of 1912.

No.	Name.	For what granted.	Expiration.	Annual rental.
<i>Leases.</i>				
	W. M. Sell, jr.	Sentinel and Glacier Point Hotels	Oct. 31, 1912	\$3,500.00
	J. W. Coffman	Livery stables	do.....	1,500.00
	Chris Jorgensen	Studio	Oct. 31, 1914	1.00
<i>Permits.</i>				
1	H. C. Best	Studio, photographs, etc.	Oct. 31, 1912	300.00
2	J. T. Boyesen	do.	do.	300.00
3	J. W. Coffman	Blacksmith shop	do.	40.00
4	David A. Curry	Public camp	do.	1,000.00
5	John Degnan	Residence	do.	20.00
6	Mrs. John Degnan	Delicatessen store	do.	150.00
7	F. G. Drum, lessee	Transportation	do.	2,000.00
8	George Fiske	Studio, photographs, etc.	do.	20.00
9	D. J. Foley	do.	do.	250.00
10	F. W. McCauley	Meat market	do.	25.00
11	Arthur C. Pillsbury	Studio, photographs, etc.	do.	300.00
12	Nelson L. Salter	General merchandise store	do.	1,000.00
13	W. M. Sell, jr.	Public camp	do.	1,000.00
14	W. M. Sell	do.	do.	1,000.00
15	Fred H. Smith	Shoe repairing, etc.	do.	25.00
16	Yosemite Transportation Co.	Transportation	do.	2,500.00
17	do.	Hauling freight	do.	250.00
18	E. N. Baxter	Studio, photographs, etc.	do.	50.00
19	Charles A. Kenney	Guide	do.	60.00
20	John Baker, jr.	Transportation	do.	100.00
21	Edward Torrence	Guide	do.	20.00

HOTELS AND CAMPS.

There is only one hotel in Yosemite Valley, and it was built years ago for summer use only, possesses few conveniences, and does not admit even of being remodeled to advantage. A new hotel with all conveniences for winter and summer travel and located on the north side of the valley is much needed.

Camp Ahwahnee, Camp Lost Arrow, and Camp Curry were all operated satisfactorily during the summer, and with the hotel and its annexes accommodated comfortably all visitors during the season.

The sewer system of Camp Curry was not satisfactory during part of the summer, and there was much complaint from visitors on account of it. Measures are now under consideration for remedying the trouble.

The sewer systems of all the other camps were satisfactory.

SAN FRANCISCO WATER SUPPLY.

In 1907 the Secretary of the Interior granted a hearing at San Francisco in regard to reopening the matter of granting reservoir rights of way in the Hetch Hetchy Valley and at Lake Eleanor, in the Yosemite National Park, for the furnishing of an adequate supply of Sierra water for the city of San Francisco, under an application of James D. Phelan, former mayor of the city, which had been

filed October 15, 1901, later assigned to the city, and denied by the department.

Mr. Marsden Manson, city engineer, department of public works, was given authority to act for the city, and after extended hearings, conferences, and the submission of briefs for and against the proposition, the Secretary, in the exercise of the discretion vested in him by the act of February 15, 1901, reinstated the Phelan application on May 11, 1908, and granted the option which the city of San Francisco desired until the matter could be submitted to the voters and definite action taken upon the filing of certain stipulations affording ample protection to the park lands and to the rights of the Modesto and Turlock irrigation districts to the use of the flow of the Tuolumne River. The stipulations provide, among other things, that the Lake Eleanor site shall be developed to its full capacity before beginning the development of the Hetch Hetchy site. The city will be required to pay for timber cut or used in the exploitation of the reservoir sites or rights of way for conduits, etc., and for any power which may be generated in the future and sold commercially.

The city's representatives have surveyed a dam site in sec. 3, T. 1 N., R. 19 E., at Lake Eleanor, and have taken preliminary steps to clear and explore for foundations for the dam, the timber on the site having been first appraised by a forest officer of the Department of Agriculture, at the request of the Secretary of the Interior. A camp site and temporary buildings for laborers were also established. Preliminary surveys of the Lake Eleanor main canal, running from the dam above mentioned to a junction with the Hetch Hetchy main canal, and of the Cherry Creek diversion canal, running from Cherry Creek, in sec. 8, T. 2 N., R. 19 E., to the Lake Eleanor dam site, were approved by the department on February 25, 1909.

The sum of \$13,128.77 has been accepted from the city as payment in full for timber and forest growth in the reservoir space of Lake Eleanor, Tuolumne County, Cal., upon the land under control of the United States to be flooded by the first reservoir level constructed under the grant to the city of May 11, 1908.

On February 25, 1910, the Secretary of the Interior issued a citation to the mayor and supervisors of the city and county of San Francisco to show cause why the Hetch Hetchy Valley and reservoir site should not be eliminated from the permit granted May 11, 1908, for a water supply for the said city and county. A board of Army engineers, consisting of Col. John Biddle, Lieut. Col. Harry Taylor, and Maj. Spencer Cosby, United States Engineer Corps, were detailed at the request of the Secretary of the Interior as advisory to him in the disposition of the question. Congress appropriated \$12,000 to defray the expenses of this board.

An application having been made by the city for an extension of time to secure further data, a continuance for such purpose was granted for one year, or until June 1, 1911, and the advisory board of Army engineers was authorized to receive such data as might be furnished by the city to establish its claims for the necessity for the use of the Hetch Hetchy site, and secure such further information on the subject as might be advisable. On application a further continuance was granted until December 1, 1911, and still further extensions have been granted until November 20, 1912.

BUILDINGS.

The building occupied by the superintendent as an office and residence should be converted into an administration building, containing offices and record rooms for the superintendent, supervisor, and resident engineer.

It is recommended that a separate residence be constructed for the superintendent. Four small cottages of an appearance appropriate to the environment have been built for the resident engineer, clerk, and the two electricians, at a total cost of \$16,600. They were built by day labor under the supervision of the resident engineer.

A reenforced concrete magazine for the storage of high explosives was built on the north side of the Merced River opposite Bridalveil Meadows.

POWER PLANT.

Estimates are submitted elsewhere for the improvement of this plant, which is generally of flimsy material and faulty construction.

WATER SUPPLY.

The construction of a new water-distributing system for Yosemite Valley was begun, and one concrete basin was built at the spring, and about 1 mile of 8-inch main was laid. Preparations are now in progress for resuming work on this project.

SANITATION.

The fly nuisance has become intolerable in Yosemite Valley and some arrangement for burning the manure from the various stables is an urgent need in order to prevent the multiplication of flies. A small, inexpensive garbage incinerator is soon to be built by the War Department for Camp Yosemite; and if it shall prove satisfactory for burning manure, allotment to build others for general use will be requested.

As stated elsewhere the sewage disposal of Camp Curry was unsatisfactory and remedial measures are under consideration.

The destruction of ground squirrels in cooperation with the California Board of Health has been carried on persistently during the year.

DEATHS.

Mrs. Shizuya Kwlezuma, Japanese, died of tuberculosis in Camp No. 8 on the night of July 18, 1912, and Mrs. May Weisgerber, employed at the Glacier Point Hotel, was accidentally killed by a falling tree on the afternoon of September 23, 1912. In each case the body was removed from the park.

CAMP YOSEMITE.

Seven cottages, two barracks, and two lavatories, of a temporary character, were built at Camp Yosemite by the War Department and a water and sewer system installed there, all of which has added greatly to the comfort and contentment of the troops. Lieut. H. S.

Johnson, First Cavalry, quartermaster, was indefatigable in improving the post and making it more attractive in appearance as well as comfortable.

A temporary building for the hospital is now under construction and will be finished by the end of October, 1912.

VISITORS.

Between October 1, 1911, and March 31, 1912, there were 795 visitors to the valley, and between April 1, 1912, and August 31, 1912, there were 9,789 visitors to the valley, which were distributed about as follows: Sentinel Hotel, 2,615; Camp Lost Arrow, 954; Camp Ahwahnee, 1,162; Camp Curry, 3,526; and transient camps, 1,532. In addition to these visitors to the valley it is estimated that about 300 people visited the park during the season who did not come to Yosemite Valley. This makes the total number of visitors to the park during the season of 1912, 10,884.

About 7,984 of these visitors were transported by the Yosemite Valley Railroad to El Portal and by the Yosemite Transportation Co. from such terminus to Yosemite Valley. The Yosemite Transportation Co. also carried 2,950 of these visitors from Yosemite Valley to the Mariposa Big Tree Grove during the season.

The following list, though incomplete as to the full number of tourists to the Yosemite National Park, indicates the points in the United States and the foreign countries from which 9,037 of the visitors came.

Residences of visitors to Yosemite National Park.

UNITED STATES.

Alabama	13	Nevada	9
Arizona	20	New Hampshire	15
Arkansas	2	New Jersey	117
California	5,360	New Mexico	5
Colorado	36	New York	942
Connecticut	53	North Carolina	3
District of Columbia	64	North Dakota	4
Delaware	10	Ohio	176
Florida	13	Oklahoma	35
Georgia	18	Oregon	62
Illinois	247	Pennsylvania	284
Idaho	4	Rhode Island	23
Indiana	93	South Carolina	5
Iowa	52	South Dakota	3
Kansas	34	Tennessee	18
Kentucky	32	Texas	60
Louisiana	19	Utah	10
Massachusetts	222	Virginia	22
Maine	12	Vermont	16
Maryland	38	Washington	36
Michigan	62	West Virginia	6
Minnesota	25	Wisconsin	70
Missouri	134	Wyoming	1
Montana	1		
Nebraska	21	Total	8,507

FOREIGN COUNTRIES.

Australia	47	Japan	2
Austria	16	Java	2
Algeria	4	Korea	2
Belgium	5	Mexico	14
British West Indies	1	Norway	1
Canada	30	New Zealand	6
China	8	South America	8
Denmark	3	South Africa	3
Egypt	6	Spain	5
France	32	Switzerland	6
Great Britain	150	Tahiti	3
Germany	83	Philippine Islands	5
Hawaii	36	Russia	9
Holland	25		
Hungary	1	Total	530
India	13		
Italy	4	Grand total	9,087

ESTIMATES.

The following are the estimated expenditures required during the fiscal year ending June 30, 1914:

Estimates for fiscal year 1914.

Pay of 1 civil engineer	\$2,000.00
Pay of 1 supervisor	1,800.00
Pay of 1 stenographer and typewriter	1,200.00
Pay of 1 chief electrician	1,200.00
Pay of 1 assistant electrician	1,080.00
Pay of 1 plumber	1,080.00
Pay of 3 rangers (one yet to be authorized)	3,600.00
For sanitation, care of camp grounds, office, barns, and storehouses, etc	2,775.00
For cutting wood for fuel for department use	600.00
For maintenance and repair of 44 miles of roads, bridges, and culverts	4,000.00
For maintenance and repair of 30 miles of trails around the rim of Yosemite Valley	1,200.00
For maintenance and repair of 300 miles of trails outside of Yosemite Valley	1,800.00
For purchase of material and supplies for use in repair of roads, trails, bridges, culverts, fences, and sanitation of grounds	1,500.00
For maintenance and repair of public buildings and plants	1,500.00
For maintenance and repair of electric light and telephone lines	2,000.00
For hire of blacksmith	900.00
For hire of stock	840.00
For hauling supplies	1,000.00
For improvement of Yosemite Falls and Eagle Peak trails	1,290.00
For improving short trail to Glacier Point	700.00
For improving Nevada Falls trail	800.00
For improving Tiltill Valley-Lake Vernon trail	500.00
For plowing, seeding, and cutting hay	1,000.00
For cutting and storing ice	250.00
For purchase of forage	4,760.00
For construction of new trail from Yosemite Point via White Wolf, Hardens Lake, Smiths Meadows, to join the Hetch Hetchy trail on Poopenaut Meadows	2,500.00
For sprinkling El Portal-Yosemite Village road	9,490.00
To extend road-sprinkling system from Yosemite Village to Happy Isles and Camp Lost Arrow	2,020.00
For removal of undergrowth	2,500.00

For protection of Merced River banks in Yosemite Valley.....	\$2,500.00
For surfacing 1 mile of road from Yosemite Creek bridge through Camp Yosemite.....	2,500.00
For the purchase of miscellaneous supplies.....	5,000.00
For improvement of Camp Ahwahnee-Yosemite Village road.....	22,320.00
For improvement of Yosemite Village-Power Plant road.....	42,312.10
For improvement of Bridal Veil Falls Loop road.....	6,585.10
For improvement of road from floor of Yosemite Valley to Fort Monroe, on Wawona road.....	64,900.00
For improvement of road from floor of Yosemite Valley to Gentry's, on Big Oak Flat road.....	67,500.00
For reenforced concrete bridge to replace present El Capitan bridge over Merced River in Yosemite Valley.....	16,000.00
For reenforced concrete bridge to replace present Tenaya bridge over Tenaya Creek in Yosemite Valley.....	11,000.00
For extension and improvement of water-supply system in Yosemite Valley.....	42,889.00
For improvements to power plant.....	83,000.00
For power hauling equipment.....	8,100.00
For residence for the superintendent of the park.....	16,000.00
For making surveys and maps.....	5,000.00
Total.....	451,800.20

RECOMMENDATIONS.

In addition to the items contained in the table of estimates, all of which are recommended, the following recommendations are submitted: (1) That the patented lands in the park be purchased by the Government or exchanged for public lands outside the park; (2) that comfortable hotel accommodations be provided; (3) that a law be enacted for the government of the park similar to that provided for the Yellowstone Park.

Attention is invited to the appended report of the resident engineer, Mr. David A. Sherfey.

THANKS.

All the park officials gave me cordial, loyal, zealous support, and I thank them.

Very respectfully,

WM. W. FORSYTH,
Major, First Cavalry, U. S. Army,
Acting Superintendent Yosemite National Park.

REPORT OF RESIDENT ENGINEER.

YOSEMITE, CAL., *October 1, 1912.*

SIR: I have the honor to submit the following report of construction work done under my direction in the Yosemite National Park from October 1, 1911, to September 1, 1912:

ROADS.

For a distance of 3,085 feet a Telford base has been covered with macadam to a width of 22 feet. The macadam has a thickness of 8 inches at the center and 3 inches at the sides, requiring about 1,970 cubic yards per mile. This work was done at a cost of \$1.86 per linear foot of road. Part of this cost was due to the opening of a rock quarry and other work incident to the installation of a rock crusher, and it is expected that future work will be done at a less figure. The cost of hauling is quite high, due to the expense of maintaining teams in the Yosemite Valley. At present prices the expense per day of a 4-horse team, including wages of driver, is \$8.33. It is urged that a power tractor and dump cars be acquired for this purpose, it being confidently believed that a considerable reduction in cost of haulage will thereby be accomplished.

For a distance of 4,485 feet a roadbed was graded, covered with a Telford base, and curbed with stones, the width being 22 feet. This work was done at a cost of 64 cents per linear foot of roadway.

All of the above road work was done on the road between Camp Ahwahnee and the Pohono Bridge.

WATER SYSTEM.

The water supply of the Yosemite Valley is obtained from springs at the foot of the cliff below Glacier Point. A new collecting well has been built and put into service that catches water that has heretofore escaped around the old spring house and could not be used as a part of the supply. It is intended to build another collecting well, and at its completion practically all of the water at this source will become available for use in the valley. Six thousand feet of 8-inch cast-iron water pipe has been installed, taking the place of an old steel pipe line, a portion of which has been taken up and relaid to form a temporary line from Yosemite Village to Camp Yosemite, the old one being too small to furnish sufficient water. It is important that the water system be completed with cast-iron pipe of suitable sizes, so that a sufficient water supply may be assured and adequate fire protection provided for the buildings of the valley.

COTTAGES.

Four cottages have been practically completed at a cost of \$16,600. These buildings are for the permanent employees of the park. They are well-constructed frame buildings upon concrete foundations, and

provided with electric lights and plumbing fixtures. Bids were received from the contractors for the construction of these buildings, but were rejected because of high figures. The work was done by the Government at a cost of 14.3 cents per cubic foot, and about \$4,000 less than the lowest bid received.

MAGAZINE FOR EXPLOSIVES.

A reenforced concrete magazine for explosives has been constructed at a cost of \$600.

GRIZZLY GIANT FENCE.

A woven-wire fence has been built around the Grizzly Giant Tree, in the Mariposa Big Tree Grove, at a cost of \$337.12.

PROTECTION OF THE BANKS OF MERCED RIVER.

Wing dams have been built into the Merced River at points where the banks have been subject to heavy erosion. Eleven hundred and seventy-five cubic yards of rubble masonry has been built into these dams at an average cost of \$1.55 per cubic yard.

Very respectfully,

DAVID A. SHERFEY,
Resident Engineer.

RULES AND REGULATIONS OF MARCH 30, 1912.

The following rules and regulations for the government of the Yosemite National Park, including the Yosemite Valley and Mariposa Big Tree Grove, are hereby established and made public, pursuant to authority conferred by the acts of Congress approved October 1, 1890, February 7, 1905, and June 11, 1906:

1. It is forbidden to injure or disturb in any manner any of the mineral deposits, natural curiosities, or wonders on the Government lands within the park.

2. It is forbidden to cut or injure any timber growing on the park lands, or to deface or injure any Government property. Camping parties will be allowed to use dead or fallen timber for fuel. When felling timber, stumps must not be left higher than 12 inches from the ground.

3. Fires should be lighted only when necessary and completely extinguished when not longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

4. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is

shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof. On arrival at the first station of the park guard, parties having firearms, traps, nets, seines, or explosives, will turn them over to the sergeant in charge of the station, taking his receipt for them. They will be returned to the owners on leaving the park.

5. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

6. No person will be permitted to reside permanently, engage in any business, or erect buildings, etc., upon the Government lands in the park, without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion. No pack trains will be allowed in the park unless in charge of a duly registered guide.

7. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; the boundaries of such lands, however, must be determined and marked and defined, so that they may be readily distinguished from the park lands. While no limitations or conditions are imposed upon the use of such private lands so long as such use does not interfere with or injure the park, private owners must provide against trespass by their stock or cattle, or otherwise, upon the park lands, and all trespasses committed will be punished to the full extent of the law. Stock may be taken over the park lands to patented private lands with the written permission and under the supervision of the superintendent, but such permission and supervision are not required when access to such private lands is had wholly over roads or lands not owned or controlled by the United States.

8. Allowing the running at large, herding, or grazing of cattle or stock of any kind on the Government lands in the park, as well as the driving of such stock or cattle over same, is strictly forbidden, except where authority therefor has been granted by the superintendent. All cattle or stock found trespassing on the park lands will be impounded and disposed of as directed in regulations approved February 29, 1908.

9. No drinking saloon or barroom will be permitted upon Government lands in the park.

10. Private notices or advertisements shall not be posted or displayed on the Government lands within the reservation, except such as may be necessary for the convenience and guidance of the public.

11. It is forbidden to carve or write names or otherwise deface any of the posts, signboards, platforms, seats, railings, steps, boulders, trees, or structures of any kind in the park.

12. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who may violate any of the foregoing rules, will be summarily removed from the park and will not be allowed to

return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

No lessee or licensee shall retain in his employ any person whose presence in the park shall be deemed and declared by the superintendent to be subversive of the good order and management of the reservation.

13. The superintendent designated by the Secretary is hereby authorized and directed to remove all trespassers from the Government lands in the park and enforce these rules and regulations and all the provisions of the acts of Congress aforesaid.

INSTRUCTIONS OF MARCH 30, 1912.

1. Interference with, or molestation of, any bear or other wild animal in the park in any way by any person not authorized by the superintendent is prohibited.

2. The wanton destruction of wild flowers, plants, or shrubs growing on the park lands is forbidden.

3. *Fires.*—The greatest care must be exercised to insure the complete extinction of all camp fires before they are abandoned. All ashes and unburned bits of wood must, when practicable, be thoroughly soaked with water. Where fires are built in the neighborhood of decayed logs, particular attention must be directed to the extinguishment of fires in the decaying mold. Fire may be extinguished where water is not available by a complete covering of earth well packed down. Care should be taken that no lighted match, cigar, or cigarette is dropped in any grass, twigs, leaves, or tree mold.

4. *Camps.*—No camp will be made except at designated localities. All campers in Yosemite Valley shall first report at the office of the superintendent for assignment to camping sites, and will not change camps without permission, nor shall fires be lighted in Yosemite Valley or Mariposa Big Tree Grove without the express permission of the superintendent. Blankets, clothing, hammocks, or any other article liable to frighten teams must not be hung near the road. The same rule applies to temporary stops, such as for feeding horses or for taking luncheon.

Many successive parties camp on the same sites during the season, and camp grounds must be thoroughly cleaned before they are abandoned. Tin cans must be flattened and, with bottles, cast-off clothing, and all other debris, must be deposited in a pit provided for the purpose. When camps are made in unusual places where pits may not be provided, all refuse must be hidden where it will not be offensive to the eye.

5. *Bicycles.*—The greatest care must be exercised by persons using bicycles. On meeting a team the rider must stop and stand at side of road between the bicycle and the team—the outer side of the road if on a grade or curb. In passing a team from the rear, the rider should learn from the driver if his horses are liable to frighten, in which case the driver should halt and the rider dismount and walk past, keeping between the bicycle and the team.

6. *Fishing.*—All fish less than 8 inches in length should at once be returned to the water with the least damage possible to the fish. Fish that are to be retained must be at once killed by a blow on the back

of the head or by thrusting a knife or other sharp instrument into the head. No person shall catch more than 20 fish in one day.

7. *Dogs and cats.*—Dogs and cats are not permitted in the park.

8. *Stages.*—Stages entering Yosemite Valley shall stop at each hotel or permanent camp in the order of location, so that passengers may exercise the right of selection.

9. *Driving on roads of park.*—(a) Drivers of vehicles of any description when overtaken by other vehicles traveling at a faster rate of speed shall, if requested to do so, turn out and give the latter free and unobstructed passageway.

(b) Vehicles in passing each other must give full half of the roadway. This applies to freight outfits as well as any other.

(c) Freight, baggage, and heavy camping outfits on sidehill grades throughout the park will take the outer side of the road while being passed by passenger vehicles in either direction.

(d) Transportation companies, freight and wood contractors, and all other parties and persons using the park roads will be held liable for violations of these instructions.

(e) Mounted men on meeting a passenger team on a grade will halt on the outer side until the team passes. When approaching a passenger team from the rear, warning must be given, and no faster gait will be taken than is necessary to make the passage, and if on a grade the passage will be on the outer side. A passenger team must not be passed on a dangerous grade.

(f) All wagons used in hauling heavy freight over the park roads must have tires not less than 4 inches in width. This order does not apply to express freight hauled in light spring wagons with single teams.

10. *Miscellaneous.*—Automobiles and motor cycles are not permitted in the park.

No person shall ride or drive faster than a walk over any of the Government bridges within the park. Riding or driving at night, except on the floor of the Yosemite Valley, is forbidden.

Persons with animals using trails must keep therein; leaving the trails for the purpose of making short cuts will not be permitted.

Persons are not allowed to bathe near any of the regularly traveled roads in the park without suitable bathing clothes.

It is forbidden to bathe, wash clothes or cooking utensils, or in any other way pollute the waters of the river or creeks above the Sentinel Hotel in Yosemite Valley.

It is forbidden to water stock directly from the river or creeks above the Sentinel Hotel in Yosemite Valley. A bucket or other vessel should be used.

It is forbidden to tie stock within 100 yards of any tent or tent ground. It is forbidden to tie stock so near the river or creeks above the Sentinel Hotel in Yosemite Valley that the stock may enter these streams.

It is forbidden to soil or in any way write upon or mutilate any of the signs or structures erected for public convenience.

To take bark from any live sequoia tree on the park lands is forbidden.

Campers and all others, save those holding license from the Secretary of the Interior, are prohibited from hiring their horses, trap-pings, or vehicles to tourists or visitors in the park.

All complaints by tourists and others as to service, etc., rendered in the reservation should be made to the superintendent, in writing, before the complainant leaves the park.

11. The penalty for disregard of these instructions is summary ejection from the park.

PENALTY FOR INJURING TREES AND FOR NOT EXTINGUISHING FIRES.

[Excerpt from an act entitled "An act to provide for determining the heirs of deceased Indians, for the disposition and sale of allotments of deceased Indians, for the leasing of allotments, and for other purposes," approved June 25, 1910 (36 Stat., 857).]

SEC. 6. That section fifty of the act entitled "An act to codify, revise, and amend the penal laws of the United States," approved March fourth, nineteen hundred and nine (Thirty-fifth United States Statutes at Large, page one thousand and ninety-eight), is hereby amended so as to read:

SEC. 50. Whoever shall unlawfully cut, or aid in unlawfully cutting, or shall wantonly injure or destroy, or procure to be wantonly injured or destroyed, any tree, growing, standing, or being upon any land of the United States which, in pursuance of law, has been reserved or purchased by the United States for any public use, or upon any Indian reservation or lands belonging to or occupied by any tribe of Indians under the authority of the United States, or any Indian allotment while the title to the same shall be held in trust by the Government, or while the same shall remain inalienable by the allottee without the consent of the United States, shall be fined not more than five hundred dollars, or imprisoned not more than one year, or both.

That section fifty-three of said act is hereby amended so as to read:

SEC. 53. Whoever shall build a fire in or near any forest, timber, or other inflammable material upon the public domain, or upon any Indian reservation, or lands belonging to or occupied by any tribe of Indians under the authority of the United States, or upon any Indian allotment while the title to the same shall be held in trust by the Government, or while the same shall remain inalienable by the allottee without the consent of the United States, shall, before leaving said fire, totally extinguish the same; and whoever shall fail to do so shall be fined not more than one thousand dollars, or imprisoned not more than one year, or both.



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**REPORT OF THE ACTING SUPERINTENDENT OF
THE SEQUOIA AND GENERAL GRANT
NATIONAL PARKS.**

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REPORT OF THE ACTING SUPERINTENDENT OF THE SEQUOIA AND GENERAL GRANT NATIONAL PARKS.

CAMP SEQUOIA, CAL., *September 4, 1912.*

SIR: I have the honor to make the following report on the condition of affairs and the management of the Sequoia and General Grant National Parks:

GENERAL CONDITIONS.

The rainfall and snowfall during the winter of 1911-12 were less than usual, resulting in many of the small springs and streams being dry in August. Repair work on the roads and trails was commenced on April 16, under the direction of Walter Fry, the ranger in charge, and pressed forward so that by June 1, the date of my arrival in the park, the Giant Forest road was in far better condition than at any time previous. The trails had also been put in good condition and much of the telephone line repaired.

Troop B, First Cavalry, two officers, and a surgeon arrived for duty in the parks June 1. Camp was established at the site used last year on the Giant Forest road near Moro Rock, partly on Government land and partly on patented land. The use of the patented land was permitted by the owner without charge. The elevation is 6,411 feet, and the water supply is from a small spring, pure but limited in quantity. Snow blocked many of the trails and delayed posting some of the outposts. As soon as weather permitted detachments were posted at Grant Park, Rocky Gulch, Kaweah, Cold Spring, Weisher Mill, Elk Park Gate, Clough Cave, and Quinn Horsecamp. From these substations, as well as from the main camp, daily patrols were made. In addition to the troops there were five civilian rangers on duty in the parks. One detachment of soldiers and one civilian ranger were posted in General Grant Park.

In both parks guns were sealed upon entrance, and circulars of information containing the rules and regulations and instructions for care of camps were distributed to all parties. Sanitary conditions were under the supervision of the military surgeon and were satisfactory.

There were five fires during the summer, but in every case they were surrounded promptly by soldiers and civilian rangers and no appreciable damage to the parks resulted. The forests are in good condition with much young growth, including many little sequoias. Trails are well cleared and easy to travel.

TOURISTS, TRAVEL, AND ACCOMMODATIONS.

Many tourists visit the parks in automobiles, as they are allowed in Grant Park. A large percentage of visitors come in private vehicles and camp on the streams or near the many small springs. The register of guests at Camp Sierra in the Giant Forest up to

September 1 shows a total of 200 who remained three days or more. The register at the outposts and those of the civilian rangers show a total of 2,723, of whom 90 per cent remained three days or more. At General Grant Park there were 2,240 tourists during the season, all of whom remained three days or more. During the months of April and May there were 693 visitors in the Sequoia Park and 577 in the General Grant Park, making the total number of visitors from April 1 to September 1 to both parks 6,433.

The railroad station for Sequoia Park is Lemon Cove. There is a hotel at this place, a daily stage runs to Kaweah, reaching there about 11.30 a. m. From the latter point there is a triweekly service only to the Giant Forest, leaving at 6 a. m. Tourists are compelled to spend the night at Kaweah or Three Rivers, where the accommodations are crude and the weather unbearably hot. There is a demand for swifter transportation and a modern hotel at the journey's end. The hotel at Camp Sierra in the Giant Forest consisted of tent accommodations, screened dining room, and bath house. There is also a store, with post office and telephone service. Tent accommodations are provided in the General Grant Park, a post office, and telephone service.

CONCESSIONS.

The following concessions were granted in the Sequoia Park: Hotel at Camp Sierra, to Mrs. Stella Britten; store at Camp Sierra, to Mrs. Cora Keller; stage service to Giant Forest, to Mr. J. A. Mehrten; photograph studio in Giant Forest, to Mr. Lindley Eddy; reservoir site on Wolverton Creek and right of way for road, to Mount Whitney Power & Electric Co.

PERMITS.

The following permits were granted: To drive cattle across Sequoia Park on Mineral King Road, to Alfred Henget, W. F. Stearns, J. D. Blick, J. E. Barton, Guy Hopping, and Walter Baddock for a total of 750 head; to maintain milk cows, to Mrs. Cora M. Keller, J. Sub. Johnston, and Conrad Alles; to maintain 25 head beef cattle for hotel use, to Mrs. Stella Britten; to keep one rifle for butchering, to Mrs. Stella Britten.

IMPROVEMENT WORK.

The Giant Forest Road, the Cold Spring, Colony Mill, Hospital, and Black Oak Trails were all put in good condition under the direction of Chief Ranger Walter Fry as soon as the weather permitted in the spring, and much of the telephone line was repaired. On July 15 an allotment was made to Sequoia Park of \$800 with which 6,000 feet of water pipe was purchased to bring water from Log Creek to the military camp. A second allotment of \$800 was made on August 16, with part of which the freight was paid on the pipe, and work commenced on the Twin Lakes Trail. In General Grant Park \$500 was allotted to build a detour on the automobile road to cut out a heavy grade which had been the cause of much complaint from automobilists. This work is under charge of Ranger Decker and will be completed about the middle of September.

The Mount Whitney Power Co., on the 1st of November, 1911, increased their working force to 35 men and commenced clearing the right of way for their water-conduit line and the construction of a

large bunk house at camp site No. 2 within the park. Buildings were constructed for the accommodation of the force engaged in the power-plant enterprise. A large steam shovel was installed and large automobile trucks used in hauling their freight from the railroads. In January their force was increased to 90 men and about \$60,000 worth of machinery installed. Construction work was continued on No. 3 power plant; about $1\frac{1}{2}$ miles of the water conduit was excavated in February. This plant when completed will constitute the most modern and up to date within the State, having a capacity of 5,000 kilowatts and a generating capacity of 6,500 horsepower under normal water conditions and, with reservoir, a regulating capacity of 10,000 horsepower. The intake of water at the upper end of the water-conduit line is near the junction of the Marble and Middle Forks of the Kaweah River, at which point both streams are tapped. The water is then to be carried by water conduit $5\frac{1}{2}$ miles to the south line of the park, where it will have a fall of 750 feet through double pipe line 2,700 feet in length to the power house. The approximate cost of the enterprise when completed is set at \$500,000.

GAME.

Bears are numerous and very tame and were a terror to campers. Three were killed by orders of the acting superintendent after exhausting all peaceful means to drive them away from camps. Deer are numerous; many fawns were noticed in August. Mountain lions and wildcats were seen in a few instances. Only five elk were reported sighted. It is believed they have extended their range and that some are outside the park limits.

In November, 1911, a consignment of 38 wild turkeys, donated to the Government by the California Board of Fish and Game Commissioners, was received and liberated on the Marble Fork of the Kaweah River. All expense charges incurred in connection with the shipment were borne by the commission. The said commission also donated 2,000 rainbow trout, which were liberated in the waters of the South Fork of Kaweah River in September.

One violation of the park regulations was discovered. A deer (buck) was killed by a tourist. His horse, gun, and outfit were taken up, and he was ejected from the park, with instructions not to return unless by written permission. The punishment is wholly inadequate and carries no terror to hunters.

On September 2 a threatening fire was discovered in the canyon of the Marble Fork. The soldiers and Ranger Von Grunigen fought it for two days and one night and surrounded it by a fire break. The arrival of a heavy rain in the afternoon of the next day extinguished the smoldering embers. The fire was probably caused by an unextinguished camp fire. Civilian patrols were left to watch the territory after departure of the troops from the park.

RECOMMENDATIONS.

In submitting recommendations I beg to call attention to the following points and emphasize especially the need of road improvements: The approaching Panama-Pacific Exposition in San Francisco will bring thousands of visitors to California. They will visit the parks and expect quick and comfortable transportation and good hotel service.

It is evident from inquiry that the Sequoia Park is as yet unknown territory. Even the residents of California have admitted an ignorance of its attractions. Its mountain scenery is rugged and magnificent, rivaling in this respect many countries further distant that are annually overrun by tourists. In addition it contains the unique attraction of the giant trees, whose marvelous size and exquisite coloring are enhanced by their setting among the densely growing pines and firs. Its abundant streams are full of trout; its elevation in the Sierra Nevadas insures a cool and bracing atmosphere that gives strength to those who seek rest from the summer heat of cities. The Sequoia Park, with all its treasures, is, however, isolated and inaccessible, due to the lack of good roads. Forty-five miles of travel up hill at a snail-like pace through stifling dust does not appeal to the modern traveler. The American public has outgrown the stage-coach habit. Rapid transit by automobile or electric car is demanded in this age. If it can not be supplied to this park the tourist will spend his time and money elsewhere. Good roads and comfortable hotels would attract a money-spending class to these parks, while the fees collected would ultimately pay for the outlay.

To this end there should be built a road exclusively for automobiles up the Middle Fork of the Kaweah River, facing the Kaweah peaks, and winding under Moro Rock to join the Giant Forest Road. The route should be surveyed by a competent engineer. This would involve about 7 miles of new construction and would give a scenic route that I believe could not be rivaled anywhere in this country. From the Giant Forest it could easily be extended over comparatively flat country to join the proposed road of the Mount Whitney Power & Electric Co., which will run past the General Sherman tree and hundreds of other giant redwoods to the reservoir site on Wolverton Creek, where an area of 100 acres will be flooded. This would enable the tourists to see many of the wonders of the park without much effort. No other road should be built. Those who wish to extend their explorations can do so on foot or mounted.

Applications for modern hotel construction would naturally follow, with attendant minor concessions, all of which would bring a revenue for the maintenance of the parks. The site near Moro Rock is ideal as regards light and view; water could be piped from Log Creek.

The present road to the forest, now a sea of dust, should be widened and macadamized for the first 10 miles from the entrance gate to site of the Old Colony Mill. The granite rock that borders its route could be utilized for the purpose by operation of a stone crusher. From this divide the remaining 11 miles should be oiled through the pine and fir woods. The cost of this road work is in my report accompanying estimate blank No. 1 for fiscal year 1914, submitted this date.

The question of whether or not automobiles should be permitted within the park should in my opinion be answered in the affirmative. If a separate route be assigned for their use they will come by the hundreds, each one contributing to the park revenues. Many people own cars and use them for touring. Their money is spent along the route that they travel. It is not necessary to build roads to all the various points of interest. One good route into the park and out again should suffice and will lessen the danger of frightening wild game and the danger of fires. This route should be patrolled during

the season. The automobile influence must be reckoned with and its value as a source of revenue recognized.

Looking into the future one can anticipate the demand of the public for better means of reaching the Sequoia Park when its possibilities become better appreciated. It is manifest that this area must eventually be extended and that the private holdings within its boundary must be taken over by the United States. The history of our country is replete with examples of apathy on the part of the Government to acquire valuable land at a time when the cost is trifling. Each year's delay adds to the price at which these deeded possessions can be purchased. This might be anticipated here if the boundary be extended now to include the natural crest of the Sierra Nevadas on the east and the area of the present National Forest Reserve. This extension was described in detail by my predecessor in his report of last year. I heartily concur in his recommendation. The purchase of the private lands at a sum insignificant as compared to their actual values would give the United States a lasting asset and would settle the many annoying questions as to rights of way and demands of the owners.

Protection of game.—The deer and birds that find a home in the parks should be protected from the law-breaking hunters by the establishment of an act of Congress similar to that governing the Yellowstone Park, i. e., "a fine of not more than \$1,000 and imprisonment not exceeding two years, or both; and be adjudged to pay all costs of the proceedings." The present punishment is totally inadequate and does not deter hunters from risking detection inside the lines. The deer are tame and trusting; it is regrettable that they can not be assured safer asylum within a national park.

Telephone lines.—The importance of good telephone service can not be overemphasized; telegrams, reports of fires, of sickness, and other emergencies are dependent upon it. The circuit could be immensely improved by putting the wires on poles instead of trees and by adopting an aerial circuit instead of the earth return as at present.

Fish hatchery.—The installation of a hatchery would enable the streams to be bountifully stocked with trout and be the means of attracting many more visitors who love this form of outing.

Buffalo.—It is believed the buffalo would thrive in this park, where hundreds of cattle were formerly herded. Good feed exists in the vicinity of Elk Park gate. A small experimental herd would be watched with interest there.

Development of caves.—Cloughs and Paradise Caves should be opened up to the public. The passage to the rooms, if enlarged to give better access to the interiors, would enable many more visitors to penetrate the depths of these limestone caverns.

The Sherman tree.—Since the removal of the protecting fence that once surrounded this great tree the souvenir-hunting vandal has begun to cut into the bark. The utter disregard that certain tourists have for published rules and the lack of reverence for such a stately monument will lead to its mutilation if not guarded by a stout fence. It is already laden with initials cut into its surface. A redwood fence would be most effective and least unsightly in preventing its further desecration.

The General Grant Park.—I consider the oiling of the road most important. It can be done easily, as the soil is loose and sandy. The water system needs extension to accommodate the increasing flow of

campers. The tourist camp should be fenced to keep stock out of the immediate camp grounds and a bathhouse erected. The park fence requires some repair and three substantial and ornamental gates should be placed at the road entrances. Near the center of this park there is a short piece of road used in common by both wagons and automobiles. I strongly recommend the construction of about three-fourths mile of new road there to give completely separate routes throughout.

An administrative map of the parks alone, omitting the surrounding country, on a scale of 2 inches to the mile would be of great assistance in directing the work of patrols. There are many trails and streams and natural objects not shown in the Geological Survey map that should appear, with appropriate names for those streams and peaks that have none now.

United States troops.—The use of the troops seems to be a settled factor in the preservation of the game and protection against fire. The commanding officer acts as superintendent during their stay. His headquarters should be definitely located, in order that business may be transacted with him by visitors. The constant moving of his camp results in the change of signs, trails, and telephone lines. A carefully located site should be selected by conference between the heads of the Interior and War Departments and made permanent. The present one in the Giant Forest on the road near Moro Rock is, in my opinion, as good as can be found. Much labor has been expended upon it by soldiers and it is attractive and well laid out. An administrative building of log and rustic construction should be erected for the use of the superintendent. It could be used for storage of tools and records that are now carried up the hill in the spring and down again in the fall. Simple log shelters for the soldiers should be erected also. They are now in tents, which are cold in the early and late season and are not comfortable for a protracted stay. The floors and frames become warped from the winter snows when the tents are taken down. The cabins could be used for storage of property during the winter.

In conclusion, I desire to call attention of the Secretary to the faithful and efficient service of the soldiers of Troop B, First Cavalry, this summer in repairing roads and trails when funds were lacking for employment of civilians, and constructing corral and shelters for their animals, in working on water line for the camp, and in cheerfully responding to fire calls at any time of day or night. Their courtesy to visitors at all the outposts has been made subject of report to me. The officers who have been on duty are: First Lieut. H. N. Munro, First Cavalry; First Lieut. J. C. Pegram, First Cavalry; Lieut. J. F. Johnston, Medical Corps; and during the last 12 days Capt. S. R. Gleaves, First Cavalry. They have rendered conscientious service, and by evincing an interest in the park administration have rendered pleasant the task of protecting the department's interests.

The troop will leave the parks this date for its station at the Presidio of San Francisco, Cal., leaving the parks in charge of Ranger Fry and his assistants, C. W. Blossom, H. T. Britten, J. G. von Grunigen, and Milo S. Decker, all of whom have done their work well and paid strict attention to duty.

W. M. WHITMAN,
Captain, First Cavalry, U. S. Army,
Acting Superintendent,
Sequoia and General Grant National Parks.

RULES AND REGULATIONS.

SEQUOIA NATIONAL PARK.

General Regulations of March 30, 1912.

1. By act of Congress, approved September 25, 1890, the tract of land in the State of California described in township 18 south and ranges 30 and 31 east, and also sections 31, 32, 33, and 34, in township 17 south and range 30 east, and by act of Congress, approved October 1, 1890, the adjoining tract described as townships 15 and 16 south, ranges 29 and 30 east, and also township 17 south, range 30 east, except above-mentioned sections 31, 32, 33, and 34, have been set apart for a public park, and the same shall be known as the Sequoia National Park.

2. The park by said act is placed under the exclusive control of the Secretary of the Interior, and these rules and regulations are made and published in pursuance of the duty imposed on him in regard thereto.

3. It is forbidden to injure or disturb in any manner any of the mineral deposits, natural curiosities, or wonders on the Government lands within the park.

4. It is forbidden to cut or injure any timber growing on the park lands. Camping parties will be allowed to use dead or fallen timber for fuel.

5. Fires shall be lighted only when necessary and completely extinguished when not longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

6. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person, or persons, violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof.

7. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent of the park in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

8. No person will be permitted to reside permanently or to engage in any business on the Government lands in the park without per-

mission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion, and no pack trains shall be allowed in the park unless in charge of a duly registered guide.

9. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; the boundaries of such lands, however, must be determined, and marked and defined, so that they may be readily distinguished from the park lands. While no limitations or conditions are imposed upon the use of such private lands so long as such use does not interfere with or injure the park, private owners must provide against trespass by their stock or cattle, or otherwise upon the park lands, and all trespasses committed will be punished to the full extent of the law. Stock may be taken over the park lands to patented private lands with the written permission and under the supervision of the superintendent, but such permission and supervision are not required when access to such private lands is had wholly over roads or lands not owned or controlled by the United States.

10. Allowing the running at large, herding, or grazing of cattle or stock of any kind on the Government lands in the park, as well as the driving of such stock or cattle over same, is strictly forbidden, except where authority therefor has been granted by the superintendent. All cattle or stock found trespassing on the park lands will be impounded and disposed of as directed in regulations approved March 30, 1912.

11. The sale or use of intoxicating liquors on the Government lands in the park is strictly forbidden.

12. Private notices or advertisements shall not be posted or displayed on the Government lands within the reservation, except such as may be necessary for the convenience and guidance of the public.

13. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who may violate any of the foregoing rules, may be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

14. The superintendent designated by the Secretary is hereby authorized and directed to remove all trespassers from the Government lands in the park and enforce these rules and regulations and all the provisions of the act of Congress aforesaid.

Instructions of March 30, 1912.

1. Interference with, or molestation of any bird, bird's nest, or wild animal on the park lands in any way by any person not authorized by the superintendent is prohibited.

2. The wanton destruction of wild flowers, plants, or shrubs growing on the park lands is forbidden.

3. *Fires.*—The greatest care must be exercised to insure the complete extinction of all camp fires before they are abandoned. All ashes and unburned bits of wood must, when practicable, be thoroughly soaked with water. Where fires are built in the neighborhood of decayed logs, particular attention must be directed to the extinguishment of fires in the decaying mold. Fire may be extinguished where water is not available by a complete covering of earth well

packed down. Care should be taken that no lighted match, cigar or cigarette is dropped in any grass, twigs, leaves, or tree mold.

4. *Camps*.—In selecting a camping ground its location should be sufficiently distant from the water source, stream, or spring as not to be objectionable to those who may wish to camp in the vicinity and use the same water source at the same time. Blankets, clothing, hammocks, or any other article liable to frighten teams must not be hung near the road.

Camp grounds must be kept in sanitary and neat condition at all times, and upon their abandonment all kitchen refuse, cast-off wearing apparel, tin cans, paper boxes, etc., must be deposited in a pit provided for the purpose. When camps are made at unusual places where pits may not be provided, all refuse must be hidden where it will not be offensive, to the end that the site will be suitable for use by future campers.

5. *Bicycles*.—The greatest care must be exercised by persons using bicycles. On meeting a team the rider must stop and stand at side of road between the bicycle and the team—the outer side of the road if on a grade or curb. In passing a team from the rear, the rider should learn from the driver if his horses are liable to frighten, in which case the driver should halt and the rider dismount and walk past, keeping between the bicycle and the team.

6. *Fishing*.—All fish less than 8 inches in length should at once be returned to the water with the least damage possible to the fish. Fish that are to be retained must be at once killed by a blow on the back of the head, or by thrusting a knife or other sharp instrument into the head. No person shall catch more than 20 fish in one day.

7. *Dogs and cats*.—Cats are not permitted on the park lands, and dogs only to those persons passing through the park to the territory beyond, in which instances they must be kept tied while crossing the park. This rule does not apply to trained dogs used by Government employees in extermination of predatory wild animals, or to those used by cattlemen holding permits from the Department of the Interior to assist in driving their herds on Mineral King Road.

8. *Dead animals*.—All domestic animals that may die on the park lands at any tourist camp, or along any of the public thoroughfares, must be immediately removed to a point not nearer than one-fourth mile from such camp or thoroughfare, and there be buried at least 2 feet beneath the ground by the owner or person having charge of such animal.

9. *Driving on roads of park*.—(a) Drivers of vehicles of any description when overtaken by other vehicles traveling at a faster rate of speed, shall, if requested to do so, turn out and give the latter free and unobstructed passageway.

(b) Vehicles in passing each other must give full half of the roadway. This applies to freight outfits as well as any other.

(c) Freight, baggage, and heavy camping outfits will take the outer side of the road when being passed by passenger vehicles in either direction.

(d) Transportation companies and all other parties and persons using the park roads will be held liable for violations of these instructions.

(e) Mounted men on meeting a passenger team on a grade will halt on the outer side until the team passes. When approaching a passen-

ger team from the rear warning must be given, and no faster gait will be taken than is necessary to make the passage; and if on a grade, the passage will be on the outer side. A passenger team must not be passed on a dangerous grade.

10. *Miscellaneous*.—Automobiles and motorcycles are not permitted in the park.

No person shall ride or drive faster than a walk over any of the Government bridges within the park. Riding or driving at night other than in cases of emergency is forbidden.

Persons with animals using trails must keep therein. Leaving the trails for the purpose of making short cuts will not be permitted.

It is forbidden to wash clothing or cooking utensils or in any other way pollute the waters of the rivers and creeks of the parks, or to bathe in any of the streams near the regularly traveled thoroughfares in the park without suitable bathing clothes.

It is forbidden to water stock directly from the river or creeks above any tourist camp. A bucket or other vessel should be used.

It is forbidden to tie stock so as to permit their entering any of the streams of the parks. All animals should be kept a sufficient distance from camping grounds not to litter the ground and make unfit for use the area which may be used later as tent sites.

It is forbidden for anyone to soil or in any way write upon or mutilate any of the signs or structures erected for public convenience.

It is forbidden to take bark from any live sequoia tree on the park lands.

Campers and all others, save those holding licenses from the Secretary of the Interior, are prohibited from hiring their horses, trap-pings, or vehicles to tourists or visitors in the park.

All complaints by tourists and others as to service, etc., rendered in the reservation should be made to the superintendent, in writing, before the complainant leaves the park.

11. The penalty for disregard of these instructions is summary ejection from the park.

REGULATIONS OF MARCH 30, 1912, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK FOUND IN THE SEQUOIA AND GENERAL GRANT NATIONAL PARKS.

Horses, cattle, or other domestic live stock running at large or being herded or grazed on the Government lands in the Sequoia and General Grant National Parks without authority from the superintendent of the park, will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notices of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of an animal thus impounded may at any time before the sale thereof reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded shall not be reclaimed within 30 days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent after

10 days' notice, to be given by posting notices in six public places in the park and two public places outside the park and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof, shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership; and if not so claimed within six months from the date of sale such proceeds shall be turned into the park funds of the Sequoia and General Grant National Parks, respectively.

The superintendent shall keep a record in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, the name and address of the purchaser, the amount for which each animal was sold and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent will, in each instance, make every reasonable effort to ascertain the owner of animals impounded and to give actual notice thereof to such owner.

GENERAL GRANT NATIONAL PARK.

General Regulations of March 30, 1912.

1. By act of Congress approved October 1, 1890, the tract of land in the State of California described as sections 5 and 6, in township 14 south, range 28 east of Mount Diablo meridian, and also sections 31 and 32, of township 13 south, range 28 east of the same meridian, have been set apart for a public park, and the same shall be known as the "General Grant National Park," "General Grant" being the name by which the great tree therein is so widely known.

All other provisions of the General Grant National Park regulations are the same as those for Sequoia National Park.

Instructions of March 30, 1912.

1. Interference with or molestation of any bird, bird's nest, or wild animal on the park lands in any way by any person not authorized by the superintendent is prohibited.

2. The wanton destruction of wild flowers, plants, or shrubs growing on the park lands is forbidden.

3. *Fires.*—The greatest care must be exercised to insure the complete extinction of all camp fires before they are abandoned. All ashes and unburned bits of wood must, when practicable, be thoroughly soaked with water. Where fires are built in the neighborhood of decayed logs, particular attention must be directed to the extinguishment of fires in the decaying mold. Fire may be extinguished where water is not available by a complete covering of earth well packed down. Care should be taken that no lighted match, cigar, or cigarette is dropped in any grass, twigs, leaves, or tree mold.

4. *Camps*.—In selecting a camping ground its location should be sufficiently distant from the water source, stream, or spring as not to be objectionable to those who may wish to camp in the vicinity and use the same water source at the same time. Blankets, clothing, hammocks, or any other article liable to frighten teams must not be hung near the road.

Camp grounds must be kept in sanitary and neat condition at all times, and upon their abandonment all kitchen refuse, cast-off wearing apparel, tin cans, paper boxes, etc., must be deposited in a pit provided for the purpose. When camps are made at unusual places where pits may not be provided, all refuse must be hidden where it will not be offensive, to the end that the site will be suitable for use by future campers.

5. *Bicycles*.—The greatest care must be exercised by persons using bicycles. On meeting a team the rider must stop and stand at side of road between the bicycle and the team—the outer side of the road if on a grade or curb. In passing a team from the rear, the rider should learn from the driver if his horses are liable to frighten, in which case the driver should halt and the rider dismount and walk past, keeping between the bicycle and the team.

6. *Fishing*.—All fish less than 8 inches in length should at once be returned to the water with the least damage possible to the fish. Fish that are to be retained must be at once killed by a blow on the back of the head or by thrusting a knife or other sharp instrument into the head. No person shall catch more than 20 fish in one day.

7. *Dogs and cats*.—Cats are not permitted on the park lands, and dogs only to those persons passing through the park to the territory beyond, in which instances they must be kept tied while crossing the park. This rule does not apply to trained dogs used by Government employees in extermination of predatory wild animals.

8. *Stages*.—Stages carrying passengers through the General Grant National Park shall stop at the main tourist camp in order that passengers wishing accommodations will not be compelled to walk to the crossroads, one-fourth mile distant.

9. *Dead animals*.—All domestic animals that may die on the park lands at any tourist camp, or along any of the public thoroughfares, must be immediately removed to a point not nearer than one-fourth mile from such camp or thoroughfare, and there be buried at least 2 feet beneath the ground by the owner or person having charge of such animal.

10. *Driving on roads in park*.—(a) Drivers of vehicles of any description drawn by animals, when overtaken by other vehicles traveling at a faster rate of speed, shall, if requested to do so, turn out and give the latter free and unobstructed passageway.

(b) Vehicles in passing each other must each give full half of the roadway. This applies to freight outfits as well as any other, but not to automobiles or motor cycles otherwise provided for.

(c) Freight, baggage, and heavy camping outfits will take the outer side of the road when being passed by passenger vehicles in either direction.

(d) Transportation companies and all other parties and persons using the park roads will be held liable for violations of these instructions.

(e) Mounted men on meeting a passenger team on a grade will halt on the outer side until the team passes. When approaching a passenger team from the rear warning must be given, and no faster gait will be taken than is necessary to make the passage, and if on a grade the passage will be on the outer side. A passenger team must not be passed on a dangerous grade.

11. *Miscellaneous*.—Automobiles and motor cycles are permitted in this park under special regulations prescribed by the Secretary of the Interior.

No person shall ride or drive faster than a walk over any of the Government bridges within the park. Riding or driving at night other than in cases of emergency is forbidden.

Persons with animals using trails must keep therein; leaving the trails for the purpose of making short cuts will not be permitted.

It is forbidden to wash clothing or cooking utensils, or in any other way pollute the waters of the rivers and creeks of the parks, or to bathe in any of the streams near the regularly traveled thoroughfares in the park without suitable bathing clothes.

It is forbidden to water stock directly from the river or creeks above any tourist camp. A bucket or other vessel should be used.

It is forbidden to tie stock so as to permit their entering any of the streams of the parks. All animals should be kept a sufficient distance from camping grounds not to litter the ground and make unfit for use the area which may be used later as tent sites.

It is forbidden for anyone to soil or in any way write upon or mutilate any of the signs or structures erected for public convenience.

It is forbidden to take bark from any live sequoia tree on the park lands.

Campers and all others, save those holding licenses from the Secretary of the Interior, are prohibited from hiring their horses, trappings, or vehicles to tourists or visitors in the park.

All complaints by tourists and others as to service, etc., rendered in the reservation should be made to the superintendent, in writing, before the complainant leaves the park.

12. The penalty for disregard of these instructions is summary ejection from the park.

Regulations of March 30, 1912, Governing the Admission of Automobiles and Motor Cycles into the General Grant National Park, Cal.

Pursuant to authority conferred by the act of October 1, 1890 (26 Stat., 650), setting aside certain lands in the State of California as a public park, the following regulations governing the admission of automobiles into the General Grant National Park are hereby established and made public:

1. No automobiles will be permitted within the metes and bounds of General Grant National Park unless the owner thereof secures a written permit from the acting superintendent or his representative. Permits may be obtained from the acting superintendent at Three Rivers, Cal., or his authorized representative at the rangers' headquarters on the Government road in the General Grant National Park.

2. Applications for permits must show: (a) Name of owner, (b) number of machine, (c) name of driver, and (d) inclusive dates for

which permit is desired, not exceeding one year, and be accompanied by a fee of \$1 for a single round trip through the park, or a fee of \$5 for each machine per annum. Permits must be presented to the acting superintendent or his authorized representative at the rangers' headquarters on the Government road. The permittee will not be allowed to do a transportation business in the park without a special license therefor from the Secretary of the Interior. All permits granted at any time when automobiles can enter the park will expire on December 31 of the year of issue.

3. The use of automobiles will be permitted only on the Millwood Road; the Round Meadow Road; the North Road, north of its junction with the north end of the Round Meadow Road; and the tourists' camp grounds, and return, between the hours of 6.30 a. m. and 10.30 a. m., and between the hours of 3.30 p. m. and 6.30 p. m.

4 When teams approach, automobiles will take position on the outer edge of roadway, regardless of the direction in which they are going, taking care that sufficient room is left on the inside for the passage of teams.

5. Automobiles will stop when teams approach, and remain at rest until teams have passed or until teamsters are satisfied regarding the safety of their teams.

6. Speed will be limited to 6 miles per hour, except on straight stretches where approaching teams will be visible, when, if no teams are in sight, this speed may be increased to the rate indicated on signboards along the road; in no event, however, shall it exceed 15 miles per hour.

7. Signal with horn will be given at or near every bend to announce to approaching teams the proximity of an automobile.

8. Teams have the right of way, and automobiles will be backed or otherwise handled, as necessary, so as to enable teams to pass with safety.

9. Violation of any of the foregoing rules, or the general regulations for the government of the park, will cause revocation of permit; will subject the owner of the automobile to any damages occasioned thereby, and to ejectment from the reservation; and be cause for refusal to issue a new permit to the owner without prior sanction in writing from the Secretary of the Interior.

10. All persons passing through the park with automobiles should be required to stop at the rangers' headquarters and register their names.

11. These rules are also applicable to motor cycles, which may use only the roads herein mentioned, on payment of a fee of \$1 for each machine per annum; permits issued therefor shall expire on December 31 of the year of issue.

NOTE.—No fee will be exacted by the Government from marshals, deputy marshals, sheriffs, or authorized constables when passing through the park on official business pertaining to their offices, where the superintendent of the park is satisfied as to their identity; as to such officers in that respect the automobile regulations are waived. (December 17, 1912.)

**REPORT OF THE SUPERINTENDENT OF THE
MOUNT RAINIER NATIONAL PARK.**

691

REPORT OF THE SUPERINTENDENT OF THE MOUNT RAINIER NATIONAL PARK.

OFFICE OF SUPERINTENDENT,
Ashford, Wash., September 26, 1912.

SIR: I have the honor to submit the following report of the condition of affairs in the Mount Rainier National Park for the fiscal year ended June 30, 1912, and for the season of 1912.

By the act of Congress approved March 2, 1899 (30 Stat., 993), certain tracts of land therein described, lying in the State of Washington, were set aside for the benefit and enjoyment of the people of the United States, to be known as the Mount Rainier National Park. This park is 18 miles square, with an area of 207,360 acres, and lies wholly within the Rainier National Forest. The summit of Mount Rainier is about $1\frac{1}{2}$ miles southwest of the center of the park, but the reservation includes substantially the whole mass of the mountain proper, with its wonderful glacial system, which is said to be the largest radiating from any single peak in the world.

The park by said act is placed under the exclusive control of the Secretary of the Interior, who is authorized, among other things, to establish rules and regulations and cause adequate measures to be taken for the preservation of the natural curiosities, timber, mineral deposits, game, etc., and the removal of unlawful occupants or trespassers.

TOPOGRAPHY.

Mount Rainier is situated apart from and to the west of the main range of the Cascades. The ridges which radiate from it are high and broken. The entire area of 324 square miles included within the boundary of the park is very rough and mountainous. The summit of Mount Rainier is over 14,000 feet in altitude. The lower valleys of the Carbon and Nisqually Rivers are not more than 2,000 feet above sea level, but the general elevation of the park exceeds 4,000 feet. Although there is little rain or snow from July 1 to the middle of September, the precipitation during the remainder of the year is very great. The season of tourist travel is confined largely to June, July, August, September, and the first part of October, although parties of tourists enter the park for snowshoeing and winter sports. During the winter months the Government road is kept open for sleighs as far as Longmire Springs. Beyond this point the park is impassable for horses.

The summit of Mount Rainier is accessible from Camp of the Clouds, in Paradise Valley, and from St. Elmo Pass, between the White and Emmons Glaciers. The difficulty of the ascent depends largely upon the condition of the snow fields, which vary from year to year. It is dangerous and should not be attempted unless the party is accompanied by an official guide.

Between and below the glaciers are numerous open slopes and valleys which are covered with luxuriant growths of grasses, sedge,

and flowering plants. These parks are diversified by growths of alpine fir and hemlock and by many small lakes and running streams. They present a pleasing contrast to the snow fields and rugged peaks by which they are surrounded, and are greatly admired by visitors. Paradise Valley is the most frequented of the many parks. The Government road running through this park and for some distance beyond the Camp of the Clouds makes it easily accessible for tourists. Near Paradise Valley and at the headwaters of Tahoma Fork is Indian Henry's Hunting Ground, so named from the circumstance that it was formerly the favorite resort of a small band of Klickitat Indians. Grand Park, between the main and west forks of White River, is one of the largest and most beautiful of these open tracts. At the altitude of 6,000 feet it is an almost level grassy plateau, the greater part of which is entirely without timber. Moraine Park, between the Sluiskin Range and the Carbon Glacier, is a small and very attractive mountain valley. A natural stone bridge has recently been discovered near the west branch of the White River. The span of the bridge measures 150 feet and is 200 feet from the floor of the ravine which it crosses. In Indian Henry's Hunting Ground a waterfall with a sheer drop of over 200 feet was discovered during the month of August, 1911.

FOREST CONDITIONS.

The forest in the lower valley is of the type characteristic of western Washington and Oregon. The undergrowth is dense and the forest floor is covered with moss and with a litter of fallen branches and decayed wood. The predominant trees are the Douglas fir, hemlock, white fir, and cedar. At 3,000 feet these species occur together with the lovely and noble fir. From 4,000 feet to snow line the forest is distinctly alpine, and consists of mountain hemlock, alpine fir, and Alaska cedar. On the high ridges are numerous and extensive tracts of timber killed by fire before the creation of the park. These areas are reforesting very slowly. The high winds, scanty soil, short summers, and extremely cold winters are unfavorable to tree growth.

Only a small quantity of the timber in the park shows signs of disease, although a considerable portion of it has passed maturity. Some means should be found for the removal of the dead timber at the lower elevations. The cedar may be cut into shingle bolts and marketed, but the other species of dead timber have a value for fuel only, and all that can not be used for this purpose should be piled and burned, as the fire danger from this source is very great. The utmost care should be taken to prevent injury to the timber in the small natural parks that surround the mountain.

There is a considerable quantity of dead cedar in the Ohanapecosh Valley which could be cut into shingle bolts and sold and the revenue derived therefrom used for park improvements.

ROADS AND TRAILS.

The Government road in the park was opened for travel to the Camp of the Clouds, in Paradise Valley, a distance of 20½ miles from the park entrance, late in the summer of 1910, although not completed

at that time. During the season of 1911 approximately \$10,000 was expended on its construction above Narada Falls, this amount remaining from the original appropriation, and from July 1, 1911, to date \$4,316.26 from park revenues for its maintenance and repair. The road is well located, but in places is narrow and poorly drained. Below Longmire Springs the grade is 2 per cent and between Longmire Springs and Paradise Valley it exceeds 4 per cent only in a few short stretches. The bridges are of heavy construction and well built, except those over the Tahoma and Kautz Forks, spans of 40 and 30 feet, respectively, and these should be replaced with steel or reinforced concrete bridges. Three and one-half miles of road have been constructed by the Government from the western boundary of the Rainier National Forest to the western boundary of the national park, to connect the park and county roads. This stretch of roadway is in bad repair, there being no funds for its maintenance, and heavy rains during the past summer made it practically impassable at times for automobile traffic. It should be transferred from the War Department to the Interior Department, placed under the control of the park superintendent, and appropriations be made for its upkeep and repair. If this can not be done, immediate steps should be taken looking to its transfer to the State of Washington or Pierce County.

The present road from the western boundary of the Rainier National Forest to the Camp of the Clouds, in Paradise Valley, should be widened to 15 feet and macadamized, and at dangerous points parapets should be constructed to keep stages and automobiles from going off grade.

All Government trails in the park are well located and are in good repair. They are, however, entirely inadequate for its proper patrol and protection, and a system of trails should be laid out and constructed at the earliest possible date. Heavily timbered portions of the park are now all but inaccessible, and in the event of fire great difficulty would be experienced in getting a fire-fighting crew, with necessary tools and provisions, to these inaccessible points. A trail should be constructed around the mountain at the lowest practicable elevation, and from this main trail short trails should be built that would reach all parts of the park.

During the season of 1912 a trail was constructed from the wagon bridge near the snout of Nisqually Glacier into Paradise Valley, a distance of $1\frac{1}{2}$ miles, and all Government trails were repaired and improved.

RANGER CABINS.

There are four ranger cabins in the park. The gatekeeper's lodge on the Government road is a small log building. An addition has been built onto this cabin, which serves for an office for the park superintendent. The cabin at Longmire Springs is a three-room log house, with frame addition for kitchen. The cabin at the Carbon River station has one room and is constructed of heavy logs. The Ohanapecosh cabin is a one-room log building which was constructed during the spring of 1912, at a cost of \$347.30. Stables should be constructed at the two last-named stations. A small log ranger cabin is now being built in Paradise Valley.

MINING CLAIMS.

Prior to the act of Congress of May 27, 1908, prohibiting the further location of mining claims in the park, several hundred locations were filed in the Carbon River and White River districts and about Glacier Basin. From various causes these have been reduced, until at present there are in the districts mentioned about 30 prospects to which an active claim is asserted. Considerable development work has been done on some of the claims in the way of tunneling, road and trail construction, buildings, etc.

There are three groups of claims in the Nisqually district on which active operations are being carried on. These claims are in the vicinity of Longmire Springs. Development work consists of tunnels and buildings.

TRAVEL.

During the 1912 season 8,371 visitors entered the park by way of the Government road. Of this number, 3,380 were transient visitors and 4,991 remained three days or more. Four hundred visitors entered the park by way of Fairfax and 175 over the Ohanapecosh trail, 425 being campers who remained three days or more. The total number of visitors known to have entered the park during the season to date is 8,946. Of the total number entering the park, 3,514 traveled by stage, 4,120 by automobile, 243 by wagon, 196 by motorcycle, 772 on foot, 16 by bicycle, and 85 on horseback.

Sixty-two of "The Mountaineers," including packers and helpers, and using 29 pack animals, entered the park near the eastern boundary July 25, 1912, and, after camping at different places, left August 9 over the Carbon River trail, near the northwestern corner. They report that a number of mountain goats were seen and some deer. Several members of this party made the ascent of Mount Rainier on the White Glacier.

Heavy summer rains and the bad condition of the Government road outside the park, it is believed, kept many hundreds of persons from visiting the park during the season of 1912. The summit of Mount Rainier was reached by only 162 persons, making the total number to reach the summit to date 1,174.

GUIDES.

Seven persons were authorized to act as guides in the park during the season of 1912, four in the Nisqually River district, and three in the Carbon River district, none of the latter being permitted to guide to the summit of Mount Rainier nor across glaciers. Those authorized to guide to the summit are mountaineers of known ability, and no accidents of a serious nature have occurred where parties have been accompanied by these official guides. On August 12, 1912, Miss C. Hunt, while making the descent from Pinnacle Peak with members of a Young Men's Christian Association party, lost her footing and fell several hundred feet, being instantly killed. Mrs. A. H. Gattis was thrown from a horse at Longmire Springs August 13, and was seriously injured.

FIRES.

The summer of 1912 was very wet and no fires of a serious nature occurred. Those caused by lightning were extinguished without damage to surrounding timber.

PATROL.

During the season of 1912 the ranger force consisted of five men, two of whom are regular rangers and on duty throughout the year. Three men were employed as temporary rangers, one of them being detailed as gatekeeper at the park entrance on the Government road and two for patrol duty in different parts of the park. A systematic patrol was maintained during the summer months and a vigilant watch kept by the entire ranger force for forest fires and trespassers.

GAME.

The employment of hunters and the activity of park rangers in hunting and trapping carnivorous and predatory animals in the park are apparently assisting in the increase of deer, mountain goat, bear, grouse, and ptarmigan, which are more numerous than in former years. There has been no known hunting or killing of game in the park during the fiscal year of 1912.

Steps should be taken for setting aside a strip of land 3 miles wide in the forest reserve on all sides of the park as a game preserve, as the park animals become very tame during the summer months and when they cross the park lines to their feeding grounds in the fall they are killed by hunters. It is believed that elk would thrive in the park, and I wish to recommend that some of these animals be transferred to this park from the Yellowstone National Park.

MINERAL SPRINGS.

The Longmire Mineral Springs were discovered several years ago and are well known and noted for their curative powers. The springs are located on patented land. Bathhouses have been built and attendants are employed during the tourist season. Mineral springs have recently been discovered by a park ranger near the southeast corner of the park, their value not being known at this time.

AUTOMOBILES.

During the 1912 season 674 automobile permits were issued and \$69 machines entered the park. The speed limit in the park is 15 miles per hour, and at abrupt curves this is reduced, signs being placed at points along the road indicating the rate of speed allowed. Automobiles may use the Government road in the park during certain hours of the day. The rules and regulations governing their use of the road and admission into the park are rigidly enforced, and the disposition of most owners is to adhere to them without question. No accidents of a serious nature have occurred in the park.

HOTELS AND CAMPS.

The National Park Inn, a 3-story building located at Longmire Springs, 125 feet long by 32 feet wide, contains 36 rooms, and, by using 86 tents in connection, will accommodate 225 guests. A log clubhouse has recently been constructed near the main building. It is attractive in appearance and furnishings and is used as a recreation hall by the hotel guests. A complete refrigerating plant is operated in connection with the hotel.

A hotel is maintained on the Longmire patented tract at Longmire Springs. It is a small frame building with 12 rooms, tents being used in connection.

Tent camps are maintained at Paradise Valley and Indian Henry's Hunting Ground.

SPECIAL PERMITS.

The Tacoma Carriage & Baggage Transfer Co. operates a stage line in the park, using 30 head of horses, four 4-seated and four 3-seated stages from Longmire Springs to Paradise Valley, and between Ashford and Longmire Springs five 12-passenger automobile stages, one automobile for transporting express and baggage, and a freight wagon. This company conducts its business in a satisfactory manner. A general livery business, using 20 saddle and pack ponies, is also carried on by this company at Longmire Springs.

George B. Hall conducts a livery business at Longmire Springs and uses 37 saddle and pack horses and 13 driving horses. He operates three 3-seated stage wagons between Longmire Springs and Paradise Valley, and saddle and pack trains into Indian Henry's Hunting Ground, and gives satisfactory service.

A general photographic business is conducted in tents at Longmire Springs by Mr. L. G. Linkletter and by Mr. Elmer Ray Hackett. They make a specialty of taking photographs of parties, and carry in stock a good line of park views. Mr. Hackett also conducts a branch of his business at Paradise Valley.

Permits to operate rented automobiles in and through the park were issued to Tacoma Auto Livery Co., St. Henens Garage, and August Cultum.

The Kum-an-go Transportation Co. was granted a permit to use a 17-passenger automobile for transporting passengers from the park entrance to Longmire Springs and the reverse of the route.

Mr. J. L. Reese was granted permission to care for and cover automobiles at Nisqually Glacier.

Four persons were authorized by special permits to act as guides in the park during the season of 1912.

The Tacoma Eastern Railroad Co. was granted a permit to construct and operate a telephone line through the park.

The five-year lease which was made in favor of Fred George, June 1, 1911, for a small strip of land at Longmire Springs on which to construct a building to be used in carrying on an ice cream, confectionery, and camp grocery business for the accommodation of tourists and others in the park, was transferred to Samuel Estes July 29, 1912.

ESTIMATES AND RECOMMENDATIONS.

Estimates for the ensuing year are as follows: Salaries, \$6,900; road maintenance, \$5,000; trail construction, \$5,000; for repair and improvement of trails, \$500; protection from forest fires, \$1,000; for widening to 15 feet and macadamizing the Government road from the western boundary of the park to its terminus in Paradise Valley, \$300,000, \$75,000 of this sum to be made available each year until the total amount is expended.

The Government road now completed into Paradise Valley should be widened and improved before new roads are constructed, in order to make it safe for the combined traffic of stages and automobiles. The road should also be extended as surveyed and partially constructed 1 mile above its present terminus in Paradise Valley. A survey should be made for a complete system of roads in the park with the object of extending the present road around the east and north sides of the mountain. When the survey is completed, or such portion of it as will enable construction work on the new road to be started, work may be commenced in the northwestern part of the park, thereby opening up the beautiful mountain parks on the north side of the mountain, and in the southeastern part to make connection with the road system of Yakima County. The park being surrounded on all sides by the Rainier National Forest, it will be necessary to survey and construct roads through the forest reserve before park roads can be connected with county roads outside of this reservation. The road in the park should be constructed at the lowest practicable elevation, and if all points of interest can not be reached in this way, branch roads should be built to them. A complete system of trails is very necessary and should be given immediate consideration. A wire fence similar to the one being built in Paradise Valley should be built in Indian Henry's Hunting Ground to form a pasture for loose stock in order that it may be kept from destroying the flora in this mountain park. The validity of all mining locations in the park should be ascertained and those not held in good faith canceled. All brush and refuse resulting from the construction of the Government road, mining operations, and from other causes should be burned during the wet season. The main sewer line at Longmire Springs should be extended, and a branch line be constructed to the camp grounds, so that all sewage from this and intermediate points may enter the main line. A sewer line should also be constructed at Paradise Valley. A shelter hut should be constructed of rock at Camp Muir, to be used by persons attempting the ascent of Mount Rainier. Telephone lines should be constructed to connect the various ranger stations and road camps on the south side of the mountain with the superintendent's office. In order that the Federal Government may control all lands within the confines of the park, a sufficient sum should be appropriated by Congress to purchase the 18.2 acres of patented land at Longmire Springs. It is further recommended that congressional action be taken to protect the park by proper legislation from game trespass, and to provide a fine for the violation of the regulations in this respect promulgated by the Secretary of the Interior.

Very respectfully,

EDW. S. HALL,
Superintendent.

The SECRETARY OF THE INTERIOR.

RULES AND REGULATIONS.

GENERAL REGULATIONS OF MARCH 30, 1912.

Pursuant to the authority conferred by the acts of Congress approved March 2, 1899, and May 27, 1908, the following rules and regulations for the government of the Mount Rainier National Park, in the State of Washington, are hereby established and made public:

1. It is forbidden to injure or disturb in any manner any of the mineral deposits, natural curiosities, or wonders on the Government lands within the park.

2. It is forbidden to cut or injure any timber growing on the park lands, or to deface or injure any Government property. Camping parties will be allowed to use dead or fallen timber for fuel.

3. Fires should be lighted only when necessary and completely extinguished when not longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

4. Hunting or killing, wounding, or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof.

5. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

6. No person will be permitted to reside permanently, engage in any business, or erect buildings, etc., upon the Government lands in the park, without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion. No pack trains will be allowed in the park unless in charge of a duly registered guide.

7. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; the boundaries of such lands, however, must be determined, and marked and defined, so that they

may be readily distinguished from the park lands. While no limitations or conditions are imposed upon the use of such private lands so long as such use does not interfere with or injure the park, private owners must provide against trespass by their stock or cattle, or otherwise, upon the park lands, and all trespasses committed will be punished to the full extent of the law. Stock may be taken over the park lands to patented private lands with the written permission and under the supervision of the superintendent, but such permission and supervision are not required when access to such private lands is had wholly over roads or lands not owned or controlled by the United States.

8. Hereafter the location of mining claims under the mineral-land laws of the United States is prohibited within the park. Persons who have heretofore acquired in good faith rights to any mining location or locations shall not be permitted to injure, destroy, or interfere with the retention in their natural condition of any timber, mineral deposits, natural curiosities, or wonders within said park outside the boundaries of their respective mining claims duly located and held under the mineral-land laws.

9. Allowing the running at large, herding, or grazing of cattle or stock of any kind on the Government lands in the park, as well as the driving of such stock or cattle over same, is strictly forbidden, except where authority therefor has been granted by the superintendent. All cattle or stock found trespassing on the park lands will be impounded and disposed of as directed in regulations approved March 30, 1912.

10. No drinking saloon or barroom will be permitted upon Government lands in the park.

11. Private notices or advertisements shall not be posted or displayed on the Government lands within the reservation, except such as may be necessary for the convenience and guidance of the public.

12. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who violate any of the foregoing rules will be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

No lessee or licensee shall retain in his employ any person whose presence in the park shall be deemed and declared by the superintendent to be subversive of the good order and management of the reservation.

13. The superintendent designated by the Secretary is hereby authorized and directed to remove all trespassers from the Government lands in the park and enforce these rules and regulations and all the provisions of the acts of Congress aforesaid.

INSTRUCTIONS OF MARCH 30, 1912.

1. Interference with, or molestation of, any bear or other wild animal in the park in any way by any person not authorized by the superintendent is prohibited.

2. The wanton destruction of wild flowers, plants, or shrubs growing on the park lands is forbidden.

3. *Fires.*—The greatest care must be exercised to insure the complete extinction of all camp fires before they are abandoned. All

ashes and unburned bits of wood must, when practicable, be thoroughly soaked with water. Where fires are built in the neighborhood of decayed logs, particular attention must be directed to the extinguishment of fires in the decaying mold. Fire may be extinguished where water is not available by a complete covering of earth well packed down. Care should be taken that no lighted match, cigar, or cigarette is dropped in any grass, twigs, leaves, or tree mold.

4. *Camps*.—No camp will be made except at designated localities. All campers in Paradise Valley shall first report to the superintendent or his authorized representative for assignment to camping sites, and will not change camps without permission. Blankets, clothing, hammocks, or any other article liable to frighten teams must not be hung near the road. The same rule applies to temporary stops, such as for feeding horses or for taking lunch.

5. *Rubbish*.—Many successive parties camp on the same sites during the season, and camp grounds must be thoroughly cleaned before they are abandoned. Lunch boxes, paper, and other refuse must not be scattered along trails, roads, and at other places in the park; tin cans must be flattened, and, with bottles, cast-off clothing, and all other debris, must be deposited in a pit provided for the purpose. When camps are made in unusual places where pits may not be provided, all refuse must be hidden where it will not be offensive to the eye.

6. *Bicycles*.—The greatest care must be exercised by persons using bicycles. On meeting a team the rider must stop and stand at side of road between the bicycle and the team—the outer side of the road if on a grade or curve. In passing a team from the rear, the rider should learn from the driver if his horses are liable to frighten, in which case the driver should halt and the rider dismount and walk past, keeping between the bicycle and the team.

7. *Fishing*.—All fish less than 8 inches in length should at once be returned to the water with the least damage possible to the fish. Fish that are to be retained must be at once killed by a blow on the back of the head or by thrusting a knife or other sharp instrument into the head. No one person shall catch more than 20 fish in one day.

8. *Dogs and cats*.—Dogs and cats are not permitted on the park lands. This rule, so far as it relates to dogs, does not apply to dogs trained for use by Government employees in the extermination of predatory wild animals.

9. *Stages*.—Stages arriving at Longmire Springs and Paradise Valley shall stop at each hotel or permanent camp in the order of location, so that passengers may exercise the right of selection.

10. *Driving on roads of park*.—(a) Drivers of vehicles of any description, when overtaken by other vehicles traveling at a faster rate of speed, shall, if requested to do so, turn out and give the latter free and unobstructed passageway.

(b) Vehicles, in passing each other, must give full half of the roadway. This applies to freight outfits as well as any other.

(c) Freight, baggage, and heavy camping outfits on sidehill grades throughout the park will take the outer side of the road while being passed by passenger vehicles in either direction.

(d) Transportation companies, freight and wood contractors, and all other parties and persons using the park roads will be held liable for violations of these instructions.

(e) Mounted men on meeting a passenger team on a grade will halt on the outer side until the team passes. When approaching a passenger team from the rear, warning must be given, and no faster gait will be taken than is necessary to make the passage, and if on a grade the passage will be on the outer side. A passenger team must not be passed on a dangerous grade.

(f) All wagons used in hauling heavy freight over the park roads must have tires not less than 4 inches in width. This order does not apply to express freight hauled in light spring wagons with single teams.

(g) Pack trains will be required to follow this whenever practicable.

11. *Miscellaneous.*—No person shall ride or drive faster than a walk over any of the Government bridges within the park. Riding or driving at night is forbidden except in cases of emergency.

Persons with animals using trails must keep therein; leaving the trails for the purpose of making short cuts will not be permitted.

Persons are not allowed to bathe near any of the regularly traveled roads in the park without suitable bathing clothes.

It is forbidden to bathe, wash clothes or cooking utensils, or in any other way pollute the waters of the rivers or creeks above the hotels in the park.

It is forbidden to water stock directly from the rivers or creeks above the hotels in the park. A bucket or other vessel should be used.

It is forbidden to tie stock within 100 yards of any tent or tent ground. It is forbidden to tie stock so near the rivers or creeks above the hotels that the stock may enter these streams.

Campers and all others, save those holding license from the Secretary of the Interior, are prohibited from hiring their horses, trap-pings, or vehicles to tourists or visitors in the park.

All complaints by tourists and others as to service, etc., rendered in the reservation should be made to the superintendent in writing before the complainant leaves the park.

12. The penalty for disregard of these instructions is summary ejection from the park.

REGULATIONS OF MARCH 30, 1912, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK.

Horses, cattle, or other domestic live stock running at large or being herded or grazed in the Mount Rainier National Park without authority from the Secretary of the Interior will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notice of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of an animal thus impounded may at any time before the sale thereof reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded shall not be reclaimed within 30 days from notice to the owner or from the date of posting notices, it shall

be sold at public auction at such time and place as may be fixed by the superintendent after 10 days' notice, to be given by posting notices in six public places in the park and two public places outside the park, and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof, shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership, and if not so claimed within six months from the date of sale such proceeds shall be turned into the Mount Rainier National Park fund.

The superintendent shall keep a record in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, the name and address of the purchaser, the amount for which each animal was sold and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent will in each instance make every reasonable effort to ascertain the owner of animals impounded and to give actual notice thereof to such owner.

REGULATIONS OF MARCH 30, 1912, GOVERNING THE ADMISSION OF AUTOMOBILES AND MOTOR CYCLES.

Pursuant to authority conferred by the act of March 2, 1899 (30 Stat., 993), setting aside certain lands in the State of Washington as a public park, the following regulations governing the admission of automobiles and motor cycles into the Mount Rainier National Park are hereby established and made public:

1. No automobile or motor cycle will be permitted within the metes and bounds of the Mount Rainier National Park unless the owner thereof secures a written permit from the superintendent, Edward S. Hall, Ashford, Wash., or his representative.

2. Applications for permits must show: (a) Name of owner, (b) number of machine, (c) name of driver, and (d) inclusive dates for which permit is desired, not exceeding one year, and be accompanied by a fee of \$5 for each automobile and \$1 for each motor cycle.

Permits must be presented to the superintendent or his authorized representatives at the park entrance on the Government road. The permittee will not be allowed to do a transportation business in the park without a special license therefor from the Secretary of the Interior.

3. The use of automobiles and motor cycles will be permitted on the Government road from the western boundary of Mount Rainier National Park to Longmire Springs between the hours of 7 a. m. and 8.30 p. m., but no automobile or motor cycle shall enter the park or leave Longmire Springs in the direction of the western boundary later than 8 p. m.; the use of automobiles and motor cycles to be permitted on the Government road between Longmire Springs and the glacier between the hours of 9 a. m. and 9.30 p. m., but no automobile

or motor cycle shall leave Longmire Springs in the direction of Nisqually Glacier later than 7 p. m.

4. When teams, saddle horses, or pack trains approach, automobiles and motor cycles will take position on the outer edge of the roadway, regardless of the direction in which they are going, taking care that sufficient room is left on the inside for horses to pass.

5. Automobiles and motor cycles will stop when teams, saddle horses, or pack trains approach, and remain at rest until they have passed or until the drivers are satisfied regarding the safety of their horses.

6. Speed will be limited to 6 miles per hour, except on straight stretches where approaching teams, saddle horses, and pack trains will be visible, when, if none are in sight, this speed may be increased to the rate indicated on signboards along the road; in no event, however, shall it exceed 15 miles per hour.

7. Signal with horn will be given at or near every bend to announce to approaching drivers the proximity of a machine.

8. Horses have the right of way, and automobiles and motor cycles will be backed or otherwise handled, as necessary, so as to enable horses to pass with safety.

9. All permits granted at any time when automobiles can enter the park will expire on December 31 of the year of issue.

All automobile and motorcycle regulations heretofore issued are canceled and revoked.

10. Violation of any of the foregoing rules, or the general regulations for the government of the park, will cause the revocation of permit; will subject the owner of the automobile or motor cycle to any damages occasioned thereby and to ejection from the reservation, and be cause for refusal to issue a new permit to the owner without prior sanction in writing from the Secretary of the Interior.

EXCERPT FROM AN ACT ENTITLED "AN ACT TO PROVIDE FOR DETERMINING THE HEIRS OF DECEASED INDIANS, FOR THE DISPOSITION AND SALE OF ALLOTMENTS OF DECEASED INDIANS, FOR THE LEASING OF ALLOTMENTS, AND FOR OTHER PURPOSES," APPROVED JUNE 25, 1910 (36 STAT., 857), PROVIDING PUNISHMENT FOR DEPREDATIONS AND FOR NOT EXTINGUISHING FIRES ON PUBLIC LANDS, ETC.

SEC. 6. That section fifty of the act entitled "An act to codify, revise, and amend the penal laws of the United States," approved March fourth, nineteen hundred and nine (Thirty-fifth United States Statutes at Large, page one thousand and ninety-eight), is hereby amended so as to read:

"SEC. 50. Whoever shall unlawfully cut, or aid in unlawfully cutting, or shall wantonly injure or destroy, or procure to be wantonly injured or destroyed, any tree, growing, standing, or being upon any land of the United States which, in pursuance of law, has been reserved or purchased by the United States for any public use, or upon any Indian reservation, or lands belonging to or occupied by any tribe of Indians under the authority of the United States, or any Indian allotment while the title to the same shall be held in trust by the Government, or while the same shall remain inalienable by the allottee without the consent of the United States, shall be fined not

more than five hundred dollars or imprisoned not more than one year, or both."

That section fifty-three of said act is hereby amended so as to read:

"SEC. 53. Whoever shall build a fire in or near any forest, timber, or other inflammable material upon the public domain, or upon any Indian reservation, or lands belonging to or occupied by any tribe of Indians under the authority of the United States, or upon any Indian allotment while the title to the same shall be held in trust by the Government, or while the same shall remain inalienable by the allottee without the consent of the United States, shall, before leaving said fire, totally extinguish the same; and whoever shall fail to do so shall be fined not more than one thousand dollars or imprisoned not more than one year, or both."

**REPORT OF THE SUPERINTENDENT OF THE
MESA VERDE NATIONAL PARK.**

707

REPORT OF THE SUPERINTENDENT OF THE MESA VERDE NATIONAL PARK.

MANCOS, COLO., August 1, 1912.

SIR: I have the honor to submit the following report on the management of the Mesa Verde National Park for the year ended June 30, 1912:

GENERAL STATEMENT.

This park was established by act of Congress approved June 29, 1906 (34 Stat., 616). It is situated in the extreme southwestern portion of Colorado, in Montezuma County, and embraces an area of 66.2 square miles (42,376 acres). The park is under the control of the Secretary of the Interior, who, in pursuance of legal authority, has prescribed rules and regulations for the administration thereof.

CHARACTER OF THE COUNTRY.

Mancos River bounds the park on the southeast. The Mesa Verde lies to the west and northwest of the canyon formed by the Mancos River. The Mesa is cut into deep canyons of various dimensions, with many short spurs, forming promontories, capped with a rim rock of colored sandstone and evergreen forest of dense piñon and cedar. The Navajo, Ruin, Moccasin, and Ute Canyons are the principal ones. Ensnconced in caves in these stone walls are found the deserted houses of what we know as the cliff dwellers. On top of the promontories are found the ancient pueblos, some of which cover many acres. Within the limits of the park there are some 400 ruins. The highest elevation of the park is 8,574 feet. These figures are taken from the topographic survey made last year.

CUSTODIANSHIP.

The custody of the park is delegated by the Secretary of the Interior to a superintendent, whose office is maintained in Mancos, Colo., the nearest railroad point to the park, where visitors can find accommodations and care. The superintendent is assisted in his duties by park rangers, who act as guides and police the park. The offices of the superintendent were turned over to me by Acting Supt. Richard Wright on September 29, 1911.

ORDER.

A high degree of order has been maintained; the ruins have been protected from vandals and curio hunters.

STOCK AND SHEEP.

It has been the custom to lease the pasture lands of the park, which are the very best in this mountain range, to owners of patented lands on the park and others. The lessees residing in the park have been of great aid in caring for the pasture and guarding against fire. No trouble has been given by any of the cattle owners and but little by one sheep owner, whose lease has been canceled.

ROADS AND TRAILS.

During the years 1910 and 1911 a main wagon road was constructed, under the direction of my two predecessors, from station O to station 166, a distance of $3\frac{1}{2}$ miles. On May 6, 1911, under instructions from the department, proposals were asked for the construction of additional road and repairs on the constructed road. The road was built from station 166 to station 343. There still remain to be constructed approximately 6 miles and 700 feet to connect with a line built north from Spruce Tree House, a distance of 6 miles. This whole line must be widened to at least 20 feet. When this is done the Mesa Verde National Park will have a safe road and a scenic highway not equaled in any State in the Union.

Authorities granted from the office of the Secretary, dated June 20 and July 1, 1912, provided for the expenditure of \$1,575 for the removal of all loose stone lying above the road and repair of the same from station O to station 166. This work will be completed by the end of August, 1912.

Under the same authority a contract was let to construct a road, 1,900 feet in length, from station O, on the north boundary line of the park, to the county road running from Mancos to Cortez. This was a difficult piece of road to build, the hillside being very steep and nothing less than a 12 per cent grade being practicable. This work is finished and ready for use. A liberal fund should be set aside for the upkeep of this whole line from the foot of Lookout Point to Spruce Tree House. Roads will wear out, and new roads need repair constantly. The trails are in a sad state of repair, and will require the expenditure of \$1,500 to make them traversable.

WATER SUPPLY.

The springs at Spruce Tree House and Balcony House yield a supply of good water for present use, but inadequate for the future, as travel will increase as soon as the roads are completed.

The wells at School Section and Soda Canyons are in excellent repair, and will be of great use during road construction in the future.

BUILDINGS.

It is my belief that the headquarters of the superintendent should be in the park, and in order to accomplish this proper buildings should be erected at the mouth of Spruce Tree Canyon, where there are 60 acres of beautiful land that can be improved, made into lawns, gardens, and building sites for all future buildings, hotel concessions, etc., which can be under the immediate supervision of the superintendent. The water can be piped to this site from the spring at Spruce Tree at a very moderate cost; the distance is approximately

1½ miles. This would obviate the necessity of installing an expensive pumping plant. A reservoir can be built at the spring at Spruce Tree House, and a sufficient supply of water will be available for all the headquarters.

When hotels are built it is my firm belief that wells of good water can be obtained on this proposed site. The fall from Spruce Tree Spring to the proposed site is approximately 700 feet.

GAME.

There are at this time a number of blacktail deer in the park. Several small herds have been seen by the rangers. A herd of 23 was counted by one of the visitors (Mr. Galceran). Great care is taken to prevent still hunters, like the Southern Utes, from hunting and destroying them.

TRAVEL.

During the past year 230 have registered at the camp at Spruce Tree House; no heavy traffic can be expected until roads are completed.

REPAIRS.

The cliff dwellings need repairs. A sum of money should be set aside to build stone steps to the Balcony House and Cliff Palace, so as to make them easy of access, as well as repair the walls and kivas that are damaged by falling rock and seepage.

LANDS.

The patented lands within the limits of the park should be acquired by the Government at as early a date as possible.

The exchange of lands with the Southern Utes should be consummated as soon as possible.

Patented lands within the park are as follows:

Patented lands in Mesa Verde National Park.

[All in T. 35 N., R. 14 W., N. Mex. principal meridian.]

	Acres.
H. E. 915, made Feb. 20, 1900, by Albert Prater, for SE. ¼ SE. ¼ sec. 18, E. ¼ NE. ¼, NE. ¼ SE. ¼, sec. 19, patented Nov. 14, 1905-----	160
H. E. 0939, made Mar. 19, 1900, by Mabyne Morefield (now Armstrong), for E. ¼ NW. ¼, E. ¼ SW. ¼, sec. 20, patented Aug. 25, 1910-----	160
C. E. 339, made Apr. 10, 1899, by Fredrick Richards, for NE. ¼ SW. ¼ sec. 28, patented July 14, 1891-----	40
C. E. 395, made Oct. 15, 1889, by George M. Comfort, for NE. ¼ NW. ¼ sec. 28, patented July 14, 1891-----	40
H. E. 0854, made Sept. 11, 1903, by Ellen Elizabeth Waters, for W. ¼ NE. ¼ and W. ¼ SE. ¼ sec. 28, patented May 15, 1911-----	160
H. E. 1021, made Feb. 16, 1900, by William F. Prater, for SE. ¼ SE. ¼ sec. 19, and E. ¼ NE. ¼, NE. ¼ SE. ¼, sec. 30, patented Aug. 10, 1906-----	160
Total-----	720

DEVELOPMENTS.

The tract covered by the Jordan lease has not as yet produced coal in any amount. This lease has been transferred to W. A. Jackson, a resident of Cortez, Montezuma County, Colo., who is engaged in

building roads and other improvements at this mine. The mine operated by George S. Todd has produced 661 tons and 1,925 pounds of coal.

RECOMMENDATIONS.

I recommend that Federal control over the 5-mile limit or strip surrounding the park be relinquished, as this territory contains no ruins of any importance, and it is very difficult to police this territory with the limited force at hand.

A wagon road should be built down Navajo Canyon to the mouth of Spruce Canyon, to the building site, a distance of 9 miles. This road will be easy to build most of the way, as the grade does not exceed 5 per cent. A concession should be granted for a hotel at the site of the park headquarters. When the road is completed the present camp will be inadequate to care for the traveling public.

A telephone line should be built from Mancos to this proposed headquarters, a distance of $16\frac{1}{2}$ miles from the main line running from Mancos to Cortez. This work has been estimated at \$125 a mile.

I can not too urgently recommend the building of a headquarters for the park on the site proposed and the removal of the office from Mancos at an early date.

Very respectfully,

S. E. SHOEMAKER,
Superintendent.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

APPENDIX.

ACT OF JUNE 29, 1906 (34 STAT., 616), CREATING THE MESA VERDE NATIONAL PARK.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby reserved from settlement, entry, sale, or other disposal, and set apart as a public reservation, all those certain tracts, pieces, and parcels of land lying and being situate in the State of Colorado, and within the boundaries particularly described as follows: Beginning at the northwest corner of section twenty-seven, township thirty-five north, range sixteen west, New Mexico principal meridian; thence easterly along the section lines to the southwest corner of the southeast quarter of section twenty, township thirty-five north, range fifteen west; thence northerly to the northwest corner of the southeast quarter of said section; thence easterly to the northeast corner of the southeast quarter of said section; thence northerly to the northwest corner of section twenty-one, said township; thence easterly to the northeast corner of the northwest quarter of said section; thence northerly to the northwest corner of the southeast quarter of section sixteen, said township; thence easterly to the northeast corner of the southeast quarter of section fifteen, said township; thence southerly to the southeast corner of said section; thence easterly to the southwest corner of section thirteen, said township; thence northerly to the northwest corner of the southwest quarter of said section; thence easterly to the northeast corner of the southwest quarter of said section; thence northerly to the northwest corner of the northeast quarter of said section; thence easterly to the northeast corner of said section; thence northerly to the northwest corner of the southwest quarter of section seven, township thirty-five north, range fourteen west; thence easterly to the northeast corner of the southwest quarter of said section; thence northerly to the northwest corner of the southeast quarter of section six, said township; thence easterly to the northeast corner of the southwest quarter of section four, said township; thence southerly to the northwest corner of the southeast quarter of section nine, said township; thence easterly to the northeast corner of the southeast quarter of said section; thence southerly to the northwest corner of section twenty-two, said township; thence easterly to the northeast corner of the northwest quarter of said section; thence southerly to the northwest corner of the southeast quarter of said section; thence easterly to the northeast corner of the southeast quarter of said section; thence southerly to the northwest quarter of section twenty-six, said township; thence easterly to the northeast corner of the northwest quarter of said section; thence southerly to

the southeast corner of the southwest quarter of section thirty-five, said township; thence easterly to the northeast corner of section two, township thirty-four north, range fourteen west; thence southerly along the section line between sections one and two and between sections eleven and twelve to the northern boundary of the southern Ute Indian Reservation; thence westerly along the northern boundary of said reservation to the center of section nine, township thirty-four north, range sixteen west; thence northerly along the quarter-section lines to the northwest corner of the southeast quarter of section twenty-eight, township thirty-five north, range sixteen west; thence easterly to the northeast corner of the southeast quarter of said section; thence northerly to the northwest corner of section twenty-seven, said township, the place of beginning.

SEC. 2. That said public park shall be known as the Mesa Verde National Park, and shall be under the exclusive control of the Secretary of the Interior, whose duty it shall be to prescribe such rules and regulations and establish such service as he may deem necessary for the care and management of the same. Such regulations shall provide specifically for the preservation from injury or spoliation of the ruins and other works and relics of prehistoric or primitive man within said park: *Provided*, That all prehistoric ruins that are situated within five miles of the boundaries of said park, as herein described, on Indian lands and not on lands alienated by patent from the ownership of the United States, are hereby placed under the custodianship of the Secretary of the Interior, and shall be administered by the same service that is established for the custodianship of the park.

SEC. 3. That the Secretary of the Interior be, and he is hereby, authorized to permit examinations, excavations, and other gathering of objects of interest within said park by any person or persons whom he may deem properly qualified to conduct such examinations, excavations, or gatherings, subject to such rules and regulations as he may prescribe: *Provided always*, That the examinations, excavations, and gatherings are undertaken only for the benefit of some reputable museum, university, college, or other recognized scientific or educational institution, with a view to increasing the knowledge of such objects and aiding the general advancement of archaeological science.

SEC. 4. That any person or persons who may otherwise in any manner willfully remove, disturb, destroy, or molest any of the ruins, mounds, buildings, graves, relics, or other evidences of an ancient civilization or other property from said park shall be deemed guilty of a misdemeanor, and upon conviction before any court having jurisdiction of such offenses shall be fined not more than one thousand dollars or imprisoned not more than twelve months, or such person or persons may be fined and imprisoned, at the discretion of the judge, and shall be required to restore the property disturbed, if possible.

RULES AND REGULATIONS OF MARCH 30, 1912.

Pursuant to authority conferred by the act of Congress approved June 29, 1906, the following rules and regulations for the government of the Mesa Verde National Park, in Colorado, are hereby established and made public and extended, as far as applicable, to

all prehistoric ruins situated within 5 miles of the boundaries thereof on Indian and public lands not alienated by patent from the ownership of the United States:

1. It is forbidden to injure or disturb, except as herein provided, any of the mineral deposits, natural curiosities, wonders, ruins, and other works and relics of prehistoric or primitive man, on Government lands within the park or the ruins and other works or relics of prehistoric man on Government lands within 5 miles of the boundaries of the park.

2. Permits for the examination of ruins, the excavation of archaeological sites, and the gathering of objects of antiquity, will, upon application to the Secretary of the Interior through the superintendent of the park, be granted to accredited representatives of reputable museums, universities, colleges, or other recognized scientific or educational institutions, with a view to increasing the knowledge of such objects and aiding the general advancement of archaeological science, under the conditions and restrictions contained in present or future regulations promulgated by the Secretary of the Interior to carry out the provisions of the act of Congress approved June 8, 1906, entitled "An act for the preservation of American antiquities."

3. Persons bearing archaeological permits from the department may be permitted to enter the ruins unaccompanied after presenting their credentials to the superintendent or other park officer. Persons without archaeological permits who wish to visit and enter the ruins shall in all cases be accompanied by a park ranger or other person duly authorized by the superintendent.

4. The superintendent is authorized, in his discretion, to close any ruin on Government lands within the park or the 5-mile limit to visitors when it shall appear to him that entrance thereto would be dangerous to visitors or might result in injury to walls or other insecure portions thereof or during repairs.

5. The superintendent is authorized, in his discretion, to designate the place or places to be used by campers in the park and where firewood can be obtained by them. All garbage and refuse must be deposited in places where it will not be offensive to the eye or contaminate any water supply on the park lands.

6. It is forbidden to cut or injure any timber growing on the park lands, except as provided in paragraph 5 of these regulations; but dead or fallen timber may be taken by campers for fuel without obtaining permission therefor.

7. Fires should be lighted only when necessary and completely extinguished when not longer required. The utmost care must be taken at all times to avoid setting fire to the timber and grass.

8. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than those prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit

is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will be permitted in the park only on written permission from the superintendent.

9. No person shall be permitted to reside permanently, or to engage in any business on the Government lands in the park without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion, and no pack trains will be allowed in the park unless in charge of a duly registered guide.

10. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; the boundaries of such lands, however, must be determined, and marked and defined, so that they may be readily distinguished from the park lands. While no limitations or conditions are imposed upon the use of such private lands so long as such use does not interfere with or injure the park, private owners must provide against trespass by their stock or cattle, or otherwise, upon the park lands, and all trespasses committed will be punished to the full extent of the law. Stock may be taken over the park lands to patented private lands with the written permission and under the supervision of the superintendent, but such permission and supervision are not required when access to such private lands is had wholly over roads or lands not owned or controlled by the United States.

11. Allowing the running at large, herding, or grazing of cattle or stock of any kind on the Government lands in the park, as well as the driving of such stock or cattle over same, is strictly forbidden, except where authority therefor has been granted by the superintendent. All cattle or stock found trespassing on the park lands will be impounded and disposed of as directed in regulations approved March 30, 1912.

12. The sale of intoxicating liquors on the Government lands in the park is strictly forbidden.

13. Private notices or advertisements shall not be posted or displayed on the Government lands within the park, nor upon or about ruins on Government lands within the 5-mile strip surrounding the same, except such as may be necessary for the convenience and guidance of the public.

14. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who may violate any of the foregoing rules, will be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

15. The act creating the park provides that any person or persons who may, without having secured proper permission from the Secretary of the Interior, willfully remove, disturb, destroy, or molest any of the ruins, mounds, buildings, graves, relics, or other evidences of an ancient civilization or other property in said park, shall be deemed guilty of a misdemeanor, and upon conviction before any court having jurisdiction of such offenses, shall be fined not more than \$1,000, or imprisoned not more than 12 months, or such person or persons may be fined and imprisoned, at the discretion of the court, and shall be required to restore the property destroyed, if possible.

Any person or persons guilty of such vandalism upon Government lands within the 5-mile strip will be liable to a penalty of \$500, or imprisonment of not more than 90 days, or both, in the discretion of the court, as provided in the act of Congress approved June 8, 1906, entitled "An act for the preservation of American antiquities."

16. The superintendent designated by the Secretary of the Interior is hereby authorized and directed to remove all trespassers from the Government lands in the park, and to enforce these rules and regulations and all the provisions of the act of Congress creating the same.

The Indian police and field employees of the General Land Office are required to cooperate with the superintendent in the enforcement of these regulations as regards the 5-mile strip surrounding the park.

REGULATIONS OF MARCH 30, 1912, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK.

Horses, cattle, or other domestic live stock running at large or being herded or grazed on the Government lands in the Mesa Verde National Park without authority from the superintendent of the park, will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notices of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of an animal thus impounded may, at any time before the sale thereof, reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded should not be reclaimed within 30 days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent after 10 days' notice, to be given by posting notices in six public places in the park and two public places outside the park, and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof, shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership; and if not so claimed within six months from the date of sale such proceeds shall be turned into the Mesa Verde National Park fund.

The superintendent shall keep a record in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, and the name and address of the purchaser, the amount for which each animal was sold, and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent shall, in each instance, make every reasonable effort to ascertain the owner of animals impounded and give actual notice thereof to such owner.

**PUNISHMENT FOR DEPREDAATIONS AND FOR NOT EXTINGUISHING
FIRES ON PUBLIC LANDS, ETC.**

[Excerpt from an act entitled "An act to provide for determining the heirs of deceased Indians, for the disposition and sale of allotments of deceased Indians, for leasing of allotments, and for other purposes," approved June 25, 1910 (36 Stat., 857).]

SEC. 6. That section fifty of the act entitled "An act to codify, revise, and amend the penal laws of the United States," approved March fourth, nineteen hundred and nine (Thirty-fifth United States Statutes at Large, page one thousand and ninety-eight), is hereby amended so as to read:

SEC. 50. Whoever shall unlawfully cut, or aid in unlawfully cutting, or shall wantonly injure or destroy, or procure to be wantonly injured or destroyed, any tree, growing, standing, or being upon any land of the United States which, in pursuance of law, has been reserved or purchased by the United States for any public use, or upon any Indian reservation or land belonging to or occupied by any tribe of Indians under the authority of the United States, or any Indian allotment while the title to the same shall be held in trust by the Government, or while the same shall remain inalienable by the allottee without the consent of the United States, shall be fined not more than five hundred dollars or imprisoned not more than one year, or both.

That section fifty-three of said act is hereby amended so as to read:

SEC. 53. Whoever shall build a fire in or near any forest, timber, or other inflammable material, upon the public domain, or upon any Indian reservation, or lands belonging to or occupied by any tribe of Indians under the authority of the United States, or upon any Indian allotment while the title to the same shall be held in trust by the Government, or while the same shall remain inalienable by the allottee without the consent of the United States, shall, before leaving said fire, totally extinguish the same; and whoever shall fail to do so shall be fined not more than one thousand dollars or imprisoned not more than one year, or both.

**EXCERPT FROM THE DEFICIENCY APPROPRIATION ACT APPROVED
JUNE 25, 1910.**

The Secretary of the Interior may, upon terms and conditions to be fixed by him, grant leases and permits for the use of the land or development of the resources thereof in the Mesa Verde National Park, and the funds derived therefrom shall be covered into the Treasury of the United States: *Provided*, That such leases or grants shall not include any of the prehistoric ruins in said park or exclude the public from free or convenient access thereto; for necessary expenses hereunder there is appropriated the sum of two thousand dollars, to continue available during the fiscal year nineteen hundred and eleven.

**EXCERPT FROM ACT OF AUGUST 24, 1912, MAKING APPROPRIATION
FOR MESA VERDE PARK FOR FISCAL YEAR 1913.**

Mesa Verde National Park, Colorado: For protection and improvement of Mesa Verde National Park, Colorado, including the lands within five miles of the boundaries of said reservation, which, under the act of June twenty-ninth, nineteen hundred and six, are to be administered by the same service established for the custodianship of the park, fifteen thousand dollars.

**REPORT OF THE SUPERINTENDENT OF THE
CRATER LAKE NATIONAL PARK.**

719

REPORT OF THE SUPERINTENDENT OF CRATER LAKE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
CRATER LAKE NATIONAL PARK,
OFFICE OF SUPERINTENDENT,
Crater Lake, Oreg., September 16, 1912.

Sir: I have the honor to submit the following report of the condition and administration of affairs in the Crater Lake National Park for the season of 1912.

GENERAL STATEMENT.

The Crater Lake National Park was created by act of Congress approved May 22, 1902. It is situated in Klamath County, Oreg., and has an area of 249 square miles, or 159,360 acres. Crater Lake is immediately upon the summit of the Cascade Range of mountains, in the crater of an extinct volcano which destroyed what was probably the monarch of mountain peaks of the western coast, and which is estimated by geologists to have been more than 16,000 feet high. The lake, which is practically in the center of the park, is approximately 6 miles long and 4 miles wide, and has a water surface of 20½ square miles. The lake is 6,177 feet above sea level and the depth of the water is 2,001 feet. The almost vertical walls of the great caldera in which the lake is situated rise from 1,000 to 2,000 feet above the surface of the water. Crater Lake was first discovered by John Hillman, the leader of a party of gold hunters, on June 12, 1853.

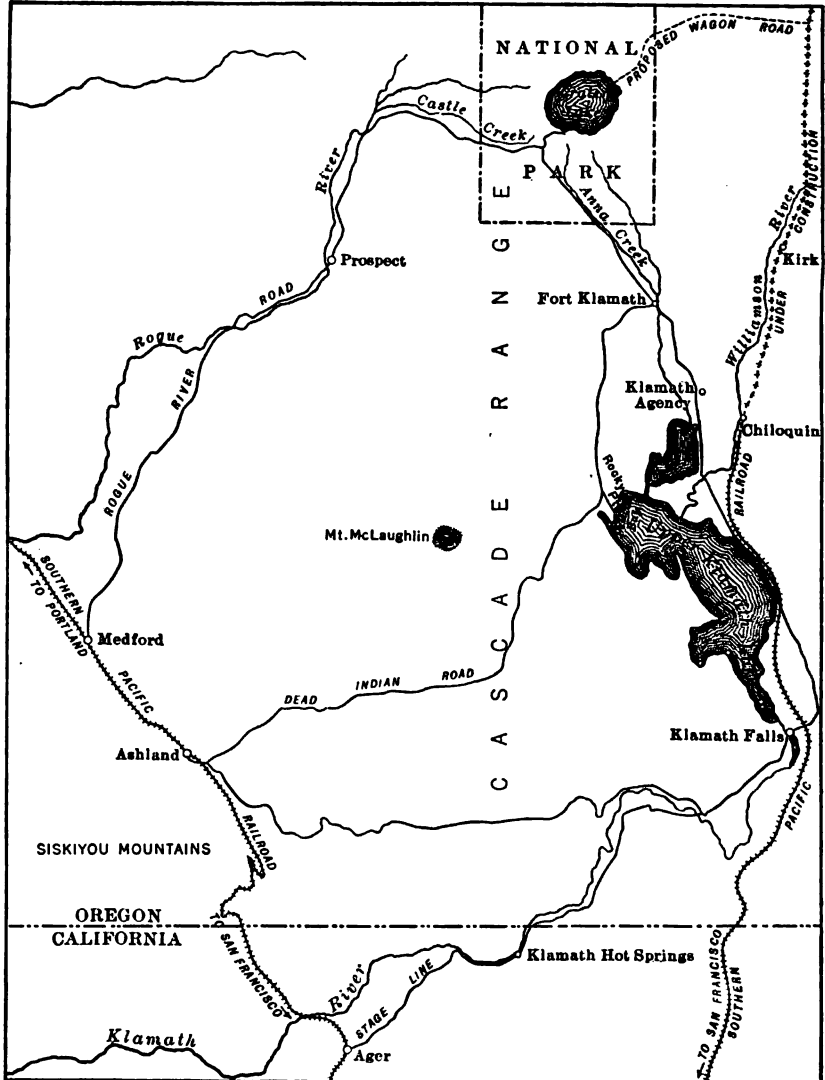
It was next seen by white men about October 1, 1862, by Chauncey Nye and his party of prospectors and miners.

It was known by some of the officers and enlisted men of Fort Klamath, Oreg., as early as 1865, but did not come into much prominence as a resort until about 1885, since which time many thousands of visitors and admirers have been attracted to its shores by its beauty and grandeur.

Crater Lake is 498 miles north of San Francisco, Cal., and is reached by way of the Southern Pacific Railroad, 436 miles to Klamath Falls, Oreg., thence by train over the same railroad to Chiloquin, about 36 miles farther north, or by launch or steamer across Klamath Lake to Harriman Lodge, Odessa, Woodbine, Rocky Point, or Agency Landing, about the same distance, leaving the remainder of the trip, about 35 miles, to be made by automobile or team. The lake is 62 miles from Klamath Falls and 22 miles from Fort Klamath. It is 416 miles south of Portland, Oreg., and is reached by way of the Southern Pacific Railroad to Medford, Oreg., 332 miles, or to Ashland, Oreg., 344 miles; thence by automobile or

team. The lake is 84 miles from Medford and 96 miles from Ashland.

During September, 1911, the roads, trails, and bridges were kept in good repair, the travel in and through the park and the automobile business was taken care of, and a patrol was kept up to prevent the



MAP SHOWING ROUTES TO CRATER LAKE.

outbreak or spread of forest fires or trespasses of any kind against the rules and regulations of the reserve.

The tourist season having closed with the month of October, 1911, the work of preparing the buildings, fences, and bridges and other property of the reserve for the winter conditions was completed by

November 9, and the snow at that date being more than 2 feet deep at the superintendent's headquarters and upon all the roads and trails in the park, and there being no travel of any kind in the reserve, I closed the buildings and took my departure for my winter quarters at Klamath Falls.

During the following winter months there was no travel in the park except some rovers or prowlers passing over on snowshoes, some of whom did considerable damage to the property of the Crater Lake Co., which has hotels in the reserve, by breaking into its buildings and using and destroying its supplies and furniture. The marauders have never been apprehended.

During the spring and early summer months of this year, and before the snow had sufficiently disappeared to admit of my remaining permanently in the park, I made frequent trips into the reserve, and in June I sent two men with a team into the park to clear the roads of fallen trees and logs, the accumulation of the winter, to replace the flooring upon the bridges and to do general repair work upon the roads and trails.

Since July 1, 1912, the usual work of repairing and improving the roads, trails, and bridges in the reserve, and keeping up a constant patrol in the park for the prevention of forest fires and trespasses has been carried on.

VISITORS.

The total number of visitors to the park during the season was 5,235, there being 27 in June, 904 in July, 2,504 in August, 1,475 in September, and 325 in October.

CONCESSIONS.

The Klamath Telephone & Telegraph Co. still holds a concession and maintains and operates a telephone line in and through the reserve.

The Crater Lake Co. also holds its concession as before, and is operating two hotels in the reserve—one upon the rim of the crater and the one at Camp Arant, near the superintendent's headquarters, 5 miles down from the lake. There have been 1,464 guests accommodated at these two hostelrys during the present season.

The Crater Lake Co. also has a license for the transportation of passengers in and through the park in five automobiles; during a portion of the season it has been carrying on this passenger transportation business in three machines, and has carried a total of 101 people.

The Klamath Development Co. also has a like permit for using six automobiles for carrying passengers in the reserve, and during the latter part of the season has carried 88 persons.

AUTOMOBILES.

Up to September 16 there have been issued 430 automobile licenses, at \$1 each, for a single round trip through the reserve. For the season there have been 11 automobile licenses issued for commercial transportation business, at \$10 each.

LOOSE STOCK DRIVEN THROUGH THE PARK.

During the season of 1912 one small herd of loose cattle was driven through the park by J. E. Pelton & Co., from western Oregon to their stock ranch, 10 miles south of the reserve.

FOREST FIRES.

During the season of 1911 there were a number of small forest fires in the reserve, some being started by lightning and some by the carelessness of persons traveling in the park. There having been more or less rain at intervals of less than two weeks during this entire summer, there were no fires started in the park this season.

ROADS AND TRAILS.

There are three wagon roads in the park—one leading from the south line of the reserve to the superintendent's headquarters, a distance of 8 miles; one from the west line of the park to the same place, a distance of 7 miles, and one from the headquarters to Crater Lake, a distance of 5 miles.

The two first-mentioned roads were built 47 years ago by the Government troops at Fort Klamath for the purpose of hauling supplies for use at the post. They are simply tracks little wider than a wagon cut out through the trees and bushes. By constant use these narrow roads have become veritable gutters the width of a wagon and in many places 1 or 2 feet deep, making it very difficult for teams to pass when meeting.

These roads have been kept in the best condition possible with the meager sum which has been available for improvement work in the park, and at some points have been widened and straightened so that teams may pass, but generally the trees, bushes, and logs are too close to the road to permit a team to turn out of the track. These roads also become very dusty in summer, so much so that it is very disagreeable to travel over them the greater portion of the season.

The dust could easily be overcome by the use of road sprinklers. There is an abundant supply of water with good fall suitably distributed along the roads, so that tanks could be filled by gravity flow.

I believe that more real benefit could be derived from the small outlay of money that would be necessary to install this improvement than in any other manner with the same amount of expense, and I can not too strongly urge that a sprinkling system be installed and continued through the dry season of 1913. Three good sprinklers should be purchased and tanks erected at suitable places along the roads.

If these roads were thus sprinkled, they would need little other improvement, as they would incline to fill up and become more level instead of being cut deeper and deeper by the wheels of the vehicles passing over them. These sprinklers could then be used upon the better roads in the park when they shall have been constructed.

In August, 1910, under the supervision of Maj. J. J. Morrow, Corps of Engineers, United States Army, there was begun the location and survey of a comprehensive system of roads in the park. Also during

'These contemplated roads consist of one from the south line of the park to the headquarters in the reserve, a distance of 8 miles; one from the west line of the park to the same place, a distance of 7 miles;



A detailed map of the park may be purchased from the Director of the Geological Survey, Washington, D. C., for 5 cents.

These contemplated roads consist of one from the south line of the park to the headquarters in the reserve, a distance of 8 miles; one from the west line of the park to the same place, a distance of 7 miles;

and one from the superintendent's headquarters to Crater Lake, a distance of 5 miles.

On the east side of the lake the engineers also located and surveyed a road from the east line of the park to the rim of the lake south of Mount Scott, a distance of about 9 miles. This survey follows along the south side of Sand Creek and Wheeler Creek by way of the Pinnacles, one of the most beautiful and interesting localities in the reserve. A road was also located from the east line of the park, north of Mount Scott, by way of Cascade Springs, to the summit or rim of the crater.

There was also located and surveyed a proposed road completely encircling the lake. For most of the distance this road will be immediately upon the rim of the crater, and when it shall have been completed it will be beyond question one of the grandest scenic roads in the world. Upon this road one will be from 1,000 to nearly 2,000 feet above the lake and at an elevation of from 7,000 to 8,000 feet above sea level, and upon the highest portion of the Cascade Mountains. It would afford an unobstructed view of the surrounding country to the north, the east, the south, and the west as far as the eye can reach. This road when completed will be about 35 miles long.

There has been recently made an appropriation by Congress of \$50,000 for the construction of roads in the park, and this sum should be used in the construction of good roads from the south and the west lines of the reserve to the lake, as these roads are much more used than any other routes into the park, and no doubt will be for some time to come.

There should be appropriated by the next Congress \$100,000 for the construction of the first section of the road around the lake, and additional appropriations should be made until the work of building the road around the lake upon the rim of the crater is completed.

The horse trails to Sun Creek, Mount Scott, to Union Peak, and to Bybee Creek should all be cut out, widened, and otherwise improved; for this purpose there should be an appropriation of \$1,500 immediately available.

BRIDGES.

Upon the roads now existing in the park there are 16 bridges and culverts, ranging in length from 16 feet to over 100 feet.

These are constructed wholly of wood, have been used a number of years, were never painted, and while they have been kept in as good repair and condition as possible they will soon have to be replaced with new structures.

During the season of 1913 the larger of these bridges should be replaced with new and better ones, having steel arches and concrete abutments. This would cost about \$10,000.

BUILDINGS AND FENCES.

The buildings and fences in the reserve will require considerable repairs and improvements, including painting, during the season of 1913. The amount of expense necessary to place the buildings and fences in proper condition for use and for their future preservation would be at least \$800.

WATER POWER AND ELECTRIC PLANT.

In order to increase the water power which operates the hydraulic ram for raising water to the superintendent's office and residence and the grounds adjacent thereto there should be a dam erected just below the large spring at the head of Anna Creek. There should also be installed at this point a small electric plant with necessary equipment to furnish light to the buildings and grounds at the headquarters in the park. This improvement would cost about \$1,100.

PARK RANGERS, RANGER STATIONS, AND TELEPHONE LINES.

The number of park rangers in the park is not adequate for maintaining a good and strong administration of its affairs nor to protect the game from poachers or the forests from the ever-prevalent forest fires. To prevent the timber from being consumed by forest fires requires constant vigilance. There should be a force able to cope with a fire when one breaks out in the reserve.

There is at present but one temporary park ranger on duty from July 1 to September 30, whereas there should be one permanent park ranger on duty the year round and five temporary rangers or guards on duty from July 1 to September 30.

Five ranger stations should be built in the outlying sections of the park, and all these should be connected with each other and with the superintendent's office by a good telephone line. These necessary improvements in the park and in the service would cost \$4,725.

PATENTED LANDS.

There are approximately 1,200 acres of patented lands lying in the southeast corner of the park, the title to which should be acquired by the Government.

These lands are mainly, if not wholly, timbered and are presumably being held for speculation or for the purpose of manufacturing the timber into lumber.

Timberlands are becoming more scarce and consequently more valuable each year, and it is only reasonable to suppose that the time is short when some milling company will acquire control of these lands and that that section of the park will be entirely denuded of its fine and highly valuable timber.

I think it would be greatly to the interests of the Government to purchase all private claims within the reserve and thus extinguish them, and I can not too strongly again urge that the necessary action be taken by the Government for the acquisition of the title to all of these patented lands in the park.

GAME AND GAME PRESERVE.

There is not a great variety of game animals or birds in the park. Black and brown bears, some smaller fur-bearing animals, such as the pine marten, the fisher, and several varieties of squirrels, including the fine silver gray, comprise the principal valuable game animals of the reserve. There are a good many blacktail deer in the park in the summer, but they, as well as the other animals and the

birds, are compelled to migrate to lower and warmer climate during the winter season.

Owing, I think, to the season having been much cooler and more wet than usual, there have not been as many deer in the reserve this summer as during the past two seasons.

The ringtail grouse and the native or timber pheasant are the principal game birds. There are some other birds here, however, such as the blue jays, the camp robbers, robins, orioles, etc.

For the protection of the game which make their home in the park in the summer months—more especially the deer and the birds—I would recommend the creation of a game preserve adjoining the park on the north and the west; by this means they would have the same protection in the winter as in the summer when they stay in the mountains included in the park.

As has been said, a national park should not be made a game preserve to set up standing, living targets on its borders, nor should it be used to tame the deer so they will become the easy prey of the deer skinner when the deep snow compels them to go down and outside of the park in order to live through the winter.

The tract I would recommend being made a game preserve would be bounded approximately as follows: Beginning at the northeast corner of the park and thence running north along the meridian 122° west longitude to the north line of township 27 south; thence west to the northwest corner of township 27 south, range 3 east; thence south to the parallel 42° 48' north latitude; thence east along the said parallel 42° 48' to the meridian 122° 16' west longitude, this being the southwest corner of the park; thence north along the said meridian 122° 16' west longitude to the parallel 43° 04' north latitude, the northwest corner of the park, thence east along said parallel 43° 04' to the meridian 122° west longitude, the place of beginning.

The area embraced within the proposed lines lies wholly, or almost wholly, in the Crater National Forest, extends well down on the western and lower slopes of the mountains and hills, where the snow-fall of the winter is light, and would make an ideal wintering ground for the deer and other animals and birds of the park and, so far as is known by the superintendent, there are no settlers nor private holdings within its boundaries.

FISH AND FISHING.

There are no fish in any of the waters of the park except Crater Lake and lower Anna Creek, below the falls. Crater Lake is well stocked with rainbow trout; those caught are usually from 14 to 20 inches in length, and some have been caught 24 or 26 inches long and weighing 6 or 7 pounds. Two years ago 50,000 fry of the rainbow trout were planted in the lake, and another consignment was planted there this year. This frequent restocking keeps up a bountiful supply in the lake. There are some Dolly Varden trout in lower Anna Creek, and upper Anna Creek and its tributaries and Sand Creek, Wheeler Creek, and Castle Creek should all be stocked with some good variety of mountain trout.

Fishing with hook and line only is allowed in Crater Lake from July 1 to September 30, the catch of each fisherman being limited to five fish in any one day. Fishing in all other waters of the reserve is allowed under the regulations prescribed by the State laws.

PREDATORY ANIMALS.

The predatory animals in the park include panthers, or cougars, bobcats (lynx), gray, or timber, wolves, and coyotes; all four of these species of animals are very destructive to the deer. I believe there are 10 deer killed by these animals to 1 killed by the hunters.

There are evidences of there being some of these destructive animals in the park during each summer, but when the deer are driven down to the lower altitudes by the storms and snows of the fall and winter, these animals follow so they may prey upon them during the winter months. I would favor taking steps to exterminate, if possible, these harmful animals.

ACCIDENTS.

As a result of the caution exercised in regard to the quality, condition, and management of all automobiles and other conveyances used upon the roads, and all launches and other boats upon the lake, there have been no accidents during the tourist seasons of 1911 or 1912.

OBSERVANCE OF RULES AND REGULATIONS.

It is pleasing to note that there has been, apparently, very little or no disposition shown intentionally to violate any of the rules and regulations of the park. There have been no arrests nor trials during the season of 1912.

Very respectfully,

W. F. ARANT, *Superintendent.*

The SECRETARY OF THE INTERIOR.

RULES AND REGULATIONS.

GENERAL REGULATIONS OF MARCH 30, 1912.

By act of Congress approved May 22, 1902, the tract of land bounded north by the parallel forty-three degrees four minutes north latitude, south by forty-two degrees forty-eight minutes north latitude, east by the meridian one hundred and twenty-two degrees west longitude, and west by the meridian one hundred and twenty-two degrees sixteen minutes west longitude, having an area of two hundred and forty-nine square miles, in the State of Oregon, and including Crater Lake, has been reserved and withdrawn from settlement, occupancy, or sale under the laws of the United States, and dedicated and set apart forever as a public park or pleasure ground for the benefit of the people of the United States, to be known as Crater Lake National Park.

The park by said act is placed under the exclusive control of the Secretary of the Interior, and these rules and regulations are made and published in pursuance of the duty imposed on him in regard thereto.

1. It is forbidden to injure, or destroy in any manner, any of the natural curiosities or wonders within the park, or to disturb the mineral deposits in the reservation, except under the conditions prescribed in paragraph 11 of these regulations.

2. It is forbidden to cut or injure any timber growing on the park lands, except for use in the construction of places of entertainment and in connection with the working of located mining claims, or to deface or injure any Government property. Camping parties and others on the reservation will be allowed to use dead or fallen timber for fuel in the discretion of the superintendent.

3. Fires should be lighted only when necessary and completely extinguished when not longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

4. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof.

5. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited.

Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

All fish less than 8 inches in length should at once be returned to the water with the least damage possible to the fish. Fish that are to be retained must be at once killed by a blow on the back of the head or by thrusting a knife or other sharp instrument into the head.

6. No person will be permitted to reside permanently, engage in any business, or erect buildings, etc., upon the Government lands in the park without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion. No pack trains will be allowed in the park unless in charge of a duly registered guide.

7. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; the boundaries of such lands, however, must be determined and marked and defined, so that they may be readily distinguished from the park lands. While no limitations or conditions are imposed upon the use of such private lands so long as such use does not interfere with or injure the park, private owners must provide against trespass by their stock or cattle, or otherwise, upon the park lands, and all trespasses committed will be punished to the full extent of the law. Stock may be taken over the park lands to patented private lands with the written permission and under the supervision of the superintendent, but such permission and supervision are not required when access to such private lands is had wholly over roads or lands not owned or controlled by the United States.

8. Allowing the running at large, herding, or grazing of cattle or stock of any kind on the Government lands in the park, as well as the driving of such stock or cattle over same, is strictly forbidden, except where authority therefor has been granted by the superintendent. All cattle or stock found trespassing on the park lands will be impounded and disposed of as directed in regulations approved March 30, 1912.

9. No drinking saloon or barróom will be permitted upon Government lands in the park.

10. Private notices or advertisements shall not be posted or displayed on the Government lands within the reservation, except such as may be necessary for the convenience and guidance of the public.

11. The act provides that, under such regulations as the Secretary of the Interior may prescribe, the reservation shall be open "to the location of mining claims and the working of the same." It was not the purpose of this provision to extend the mining laws to the park without limitation, but only to authorize the location and working of mining claims thereon, under regulations to be prescribed by the Secretary of the Interior, and in such manner as not to interfere with or prejudicially affect the general purpose for which the reservation was established. It is therefore prescribed:

(a) That persons desiring to locate mining claims within the park shall enroll their names and addresses with the superintendent of the reservation and shall file with such superintendent a description, in writing, of the land desired to be located. They shall also file with

the superintendent evidence that they are severally qualified to make locations under the mining laws, and before entering upon the park for such purpose they must obtain from the Secretary of the Interior, through the superintendent, a written permit to do so. Such permit will be issued only upon condition that the applicant or applicants therefor, while upon the reservation, will not destroy or damage any game, fish, timber, or natural objects therein, and will strictly observe and comply with the requirements of the law and these regulations.

(b) Lands in the park upon which valuable deposits of mineral shall have been or may be found may be located under the mining laws by any person or persons duly qualified and holding a permit such as is described in the preceding paragraph, and such person or persons, his or their successor or successors in interest, may work the claim or claims so located; but in carrying on the work he or they shall in all respects observe and comply with the provisions of the statute creating the park and with these regulations: *Provided*, That such person or persons may, as the proper working of such mining claim or claims shall require, be permitted to use for mining purposes such timber or stone found upon the land located as in the judgment of the superintendent may be so used without injury or damage to the reservation "as a public park or pleasure ground": *And provided further*, That within thirty days after the location of any mining claim within the park, and before development work thereon shall be commenced, a copy of the notice of location shall be filed with the superintendent, together with proof satisfactorily showing that discovery of a valuable mineral deposit has been made within the limits of the location, and, if it be a placer location, that every ten-acre tract embraced therein has been found to contain valuable deposits of mineral.

(c) The statute does not authorize the purchase of or the acquisition of the legal title to lands located as mining claims within the park. The rights of the locator or locators, therefore, will be at all times subject to forfeiture upon breach of any of the conditions mentioned in the permit herein provided for, or upon refusal or failure to comply with any of the provisions of the statute or of these regulations.

(d) Upon breach of any such conditions, or upon refusal or failure to comply in all respects with the provisions of the statute and of these regulations, or where locators of mining claims do not appear to be acting in good faith, or who after location do not work their claims in such manner as to show good faith in the assertion thereof, the superintendent will revoke their permits, forthwith remove them from the park, and report the facts to the Secretary of the Interior.

12. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who violate any of the foregoing rules, will be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

No lessee or licensee shall retain in his employ any person whose presence in the park shall be deemed and declared by the superintendent to be subversive of the good order and management of the reservation.

13. Any person who violates any of the foregoing regulations will be deemed guilty of a misdemeanor, and upon conviction be fined

not more than \$500 or imprisoned not more than one year, and shall be liable for any loss sustained by the United States as a result of such violation, as provided by the act creating the park.

14. The superintendent designated by the Secretary is hereby authorized and directed to remove all trespassers from the Government lands in the park and enforce these rules and regulations and all the provisions of the act of Congress aforesaid.

REGULATIONS OF MARCH 30, 1912, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK.

Horses, cattle, or other domestic live stock running at large or being herded or grazed in the Crater Lake National Park without authority from the Secretary of the Interior will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notice of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of an animal thus impounded may, at any time before the sale thereof, reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded shall not be reclaimed within 30 days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent, after 10 days' notice, to be given by posting notices in six public places in the park and two public places outside the park, and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof, shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership, and if not so claimed within six months from the date of sale such proceeds shall be turned into the Crater Lake National Park fund.

The superintendent shall keep a record, in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, the name and address of the purchaser, the amount for which each animal was sold and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent will, in each instance, make every reasonable effort to ascertain the owner of animals impounded and to give actual notice thereof to such owner.

REGULATIONS OF MARCH 30, 1912, GOVERNING THE ADMISSION OF AUTOMOBILES AND MOTOR CYCLES.

Pursuant to authority conferred by the act of May 22, 1902 (32 Stats., 202), setting aside certain lands in the State of Oregon as a public park, the following regulations governing the admission of

automobiles into the Crater Lake National Park are hereby established and made public:

1. No automobile will be permitted within the metes and bounds of the Crater Lake National Park unless the owner thereof secures a written permit from the superintendent or his representative.

2. Applications for permits must show: (a) Name of owner, (b) number of machine, (c) name of driver, and (d) inclusive dates for which permit is desired, not exceeding one year, and be accompanied by a fee of \$1 for a single round trip through the park, or a fee of \$5 per annum for each machine for personal use, and not for hire.

Permits must be presented to the superintendent or his authorized representative at the rangers' headquarters on the Government roads. Permittees will not be allowed to do a commercial transportation business in the park without a special license therefor from the Secretary of the Interior. All permits granted at any time when automobiles can enter the park will expire on December 31 of the year of issue.

3. The use of automobiles will be permitted on the Government roads from the southern and western boundaries of the park between the hours of 6.30 a. m. and 10.30 a. m., and between the hours of 3.30 p. m. and 6.30 p. m.

4. When teams approach, automobiles will take position on the outer edge of roadway, regardless of the direction in which they are going, taking care that sufficient room is left on the inside for the passage of teams.

5. Automobiles will stop when teams approach and remain at rest until teams have passed or until teamsters are satisfied regarding the safety of their teams.

6. Speed will be limited to 6 miles per hour, except on straight stretches where approaching teams will be visible, when, if no teams are in sight, this speed may be increased to the rate indicated on sign-boards along the road; in no event, however, shall it exceed 15 miles per hour.

7. Signal with horn will be given at or near every bend to announce to drivers of approaching teams the proximity of an automobile.

8. Teams have the right of way, and automobiles will be backed or otherwise handled, as necessary, so as to enable teams to pass with safety.

9. Violation of any of the foregoing rules, or the general regulations for the government of the park, will cause revocation of permit; will subject the owner of the automobile to any damages occasioned thereby, and to ejection from the reservation, and be cause for refusal to issue a new permit to the owner without prior sanction in writing from the Secretary of the Interior.

10. All persons passing through the park with automobiles are required to stop at the superintendent's headquarters or the rangers' headquarters and register their names.

11. These rules are also applicable to motor cycles, which may use the park roads on payment of a fee of \$1 for each machine per annum; permits issued therefor shall expire on December 31 of the year of issue.

**REPORT OF THE ACTING SUPERINTENDENT
OF THE GLACIER NATIONAL PARK.**

735

REPORT OF THE ACTING SUPERINTENDENT OF THE GLACIER NATIONAL PARK.

GLACIER NATIONAL PARK,
OFFICE OF THE SUPERINTENDENT,
Belton, Mont., October 11, 1912.

SIR: I have the honor to make the following report on the condition of affairs and the management of the Glacier National Park.

In accordance with orders issued, I proceeded to Midvale, Mont., arriving on May 18. Several days were spent in the inspection and adjustment of matters on the east side of the range, and on May 27 I arrived at Belton, Mont., and proceeded to headquarters on Lake McDonald to relieve Acting Supt. Henry W. Hutchings, who had been in charge of the reservation subsequent to the death of Maj. William R. Logan, first superintendent of the Glacier National Park. I found general conditions excellent and work progressing along such lines as had been approved by the department.

GENERAL STATEMENT.

The Glacier National Park was established by the act of Congress approved May 11, 1910 (36 Stat., 354), and is located in north-western Montana. It embraces over 1,400 square miles of the Rocky Mountains and adjacent territory, extending north from the main line of the Great Northern Railway to the Canadian border. The eastern boundary is the Blackfeet Indian Reservation, and the western boundary is formed by the Flathead River. The park, which is irregular in shape, has an area of approximately 915,000 acres. Its greatest length in a northwesterly-southeasterly direction is about 60 miles, with a maximum width approaching 40 miles.

Within its borders are attractions for the scientist, nature lover, and tourist unsurpassed in any country in the world, tourists of world-wide experience pronouncing it the Switzerland of America. The elevations in the park range from 3,100 feet to over 10,400. The central portion of the area on the northwestern-southeastern axis is high and rugged and in sharp comparison with the open plains of the east and the valley of the North Fork of the Flathead River on the west. Within its confines are 60 active glaciers, these ice sheets being the sources of beautiful cascades and roaring mountain streams flowing into innumerable, clear, placid lakes for which the park is famed, the most noted of these being Lake McDonald, Lake St. Marys, Lake Louise, Iceberg Lake, Red Eagle Lake, Kintla Lake, Bowman Lake, Waterton Lake, Logging Lake, Quartz Lake, Harri-

son Lake, and Two Medicine Lake. Lake McDonald, the southern end of which is situated $2\frac{1}{2}$ miles from Belton, a station on the main line of the Great Northern Railway, is one of the most beautiful lakes in America. It is about 3,150 feet above sea level, nearly 10 miles long, 2 miles wide, and surrounded by mountains covered with virgin forests of western larch, cedar, white pine, Douglas fir, spruce, and hemlock. Upper Lake St. Marys is on the eastern side of the mountains about 32 miles northwest of Midvale. It is about 10 miles long, with a maximum width of 1 mile, and toward the upper end the mountains rise in rugged walls not far from the water's edge. Its elevation is about 4,470 feet above sea level. The principal glaciers in the park are Blackfoot, Grinnell, Harrison, Pumpelly, Red Eagle, Sperry, Kintla, Agassiz, and Chaney, and there are areas in which the "hanging" glacier type is well illustrated. In most of the lakes of the park there is excellent fishing at certain times of the year, and at others many of the streams afford fine sport with hook and line. Within the park boundaries there are many varieties of game which are indigenous to this section of the country, such as bear, elk, moose, deer, big-horn sheep, mountain goat, mountain lion, as well as the smaller furred animals of the forest. On April 1, 1912, a carload of elk was received from the Yellowstone National Park and turned loose in the park at Belton, the western entrance.

TRANSPORTATION AND ACCOMMODATIONS.

The only railroad line by which the park can now be reached is the Great Northern, which runs adjacent to the southern boundary for about 55 miles, the two points of entrance to the park being Glacier Park Station (Midvale post office) and Belton, the former east of the mountain crest and the latter west of it.

Early in the spring camps were established by the Great Northern Railway on Two Medicine Lake, on North Fork of Cutbank River, on Lake St. Marys, near its eastern end, and at the Upper Narrows, the latter taking the place of the temporary camp established in 1911 at the Lower Narrows; at Gunsight Lake, and at Lake McDermott.

On Sprague Creek, near the Sperry Glacier, a temporary canvas camp was maintained. At all of these camps the food and service given was excellent and at a reasonable charge. At Belton, the western gateway, the Great Northern has open during the season the Chalets, formerly constructed, where comfortable accommodations can be secured. Mr. E. E. Dow also maintains a hotel at Belton during the entire year, likewise affording good service.

At the foot of Lake McDonald Mr. Dow runs a number of cabins for the accommodation of tourists. Near the head of Lake McDonald Mr. John Lewis operates a hotel of the cabin colony type, and similar accommodations are afforded by Mr. F. C. Geduhn. During the season W. L. Adair maintains an informal but excellent house in the North Fork Valley, about 16 miles from Lake McDonald. At all these places accommodations can be secured at a reasonable figure.

From Midvale to St. Marys Chalet motor car service is established and a stage line runs to Two Medicine and Cut Bank camps. A stage

line is operated between St. Marys Chalet and McDermott Lake via Reclamation Headquarters. From Belton to the foot of Lake McDonald a stage line is operated under schedule of three round trips per day, making connections with incoming and outgoing trains on the Great Northern Railway. Gasoline launches ply on Lake McDonald, making direct connections with the stage line from Belton, and on St. Marys Lake boat service is maintained between the Lower Chalet, the Narrows, and the head of the lake. Thirteen licenses were issued to parties to conduct saddle and pack transportation, covering 525 head, which is ample to take care of visitors to the park. All these guides furnish camping outfits for such parties as wish to tour the park beyond the district served by or independent of the established camps.

ADMINISTRATION.

Owing to the fact that the appropriation for 1912-13 was not available until August 24, much important work in the development of roads and trails was necessarily deferred. On the east side of the range between Glacier Park (Midvale post office) and Divide Creek the Great Northern Railway Co. constructed an automobile road through the Blackfeet Indian Reservation, approximately 27 miles in length, under an agreement with the department. The Great Northern continued this road from Divide Creek, the park boundary, to St. Marys Lake, a distance of 4.9 miles, for which latter road they will be reimbursed by the department in the sum of \$18,479.50 when they have complied with the specifications.

The Government road from Belton to Lake McDonald constructed last year was completed in its entirety, at an additional cost of \$4,132.28, making the total cost of the road \$21,310.78. This road is now in excellent condition and has stood up well under the traffic of this season.

From the foot of Lake McDonald joining the Government road a right of way 40 feet wide was cleared and grading is now being done to Fish Creek Station, a distance of 1.9 miles. This work is under contract with L. P. Edge for the sum of \$4,695.50 and will be completed this fall. The location of this road as surveyed last season was changed and the road widened in order to avoid excessive grade.

Work on trails was pushed as rapidly as funds permitted. The old main trail from Glacier Hotel at the head of Lake McDonald to Sperry Glacier and Gunsight Pass was relocated and widened and it is now in first-class condition with the exception of a short distance which still remains to be done. Nearly all of the old trails were chopped out by rangers in their districts—in some cases laborers were employed to assist the rangers in the trail work, so that during the season 200 miles of old trails were open to visitors to the park.

At Fish Creek Station, where the Government sawmill is located log structures were erected as follows: One cottage, dimensions 20 by 30; two cabins for the use of the men employed at the sawmill, and one stable for housing government stock. In addition to these buildings the sawmill was inclosed.

Very little was added to the telephone system installed last year, due to the delay in securing the appropriation. Seven new telephones

were installed and 5 miles of line added. The private line owned and operated by John Lewis, owner of the Glacier Hotel on Lake McDonald, running from his place to Belton, a distance of approximately 10 miles, was taken over by the park at a cost of \$300. A private line $2\frac{1}{2}$ miles in length was run from the temporary park headquarters to the Great Northern station at Belton. This line was installed in order that privacy might be had in connection with the sending and receiving of important telegrams. At Logging Creek Station the park line is connected to the Forest Service line which is 7 miles long. At the present time there are $57\frac{1}{2}$ miles of telephone lines owned and operated by the park and 17 telephones installed. Connection will be made next season with the Great Northern lines east of the mountains.

Final arrangements for operating the sawmill were not completed until July 15, since which time it has been run $18\frac{1}{2}$ days. Injury to Ranger Sloan in charge of the mill and inability to secure an engineer seriously hampered the work. A shingling machine was installed under date of July 30 and run 2 days in August and 3 days in September.

The following table shows the output of the mill for the season and disposition made of lumber:

Lumber cut during season of 1912.

	Board feet.
Total amount of lumber cut.....	70, 794
Lumber used for cabins, stable, covering sawmill, outbuildings, and bridge across McDonald Creek.....	41, 050
Lumber on hand.....	29, 744
Total number of shingles cut.....	33, 000
Shingles used on cabins at Fish Creek.....	33, 000

NUMBER OF VISITORS.

From May 2, 1912, to October 1, 1912, 6,257 visitors entered the park, distributed at various places as follows:

Visitors by different entrances.

Belton (western entrance).....	4, 868
Glacier Park Station, Midvale post office (eastern entrance).....	330
By way of Swiftcurrent region (east side).....	257
From Canada via Waterton Lake.....	204
From Canada via Belly River country.....	73
By way of Browning through Indian reservation.....	25
Total.....	6, 257

The above figures show actual registration as compared with last year's statement, which in some instances was estimated, as the only registry maintained was at Belton.

The following shows the registration by States, Territories, and foreign lands, compiled as of date September 26, for the Belton and Glacier Park Station entrances:

Residences of visitors.

Alabama-----	63	Tennessee-----	10
Arizona-----	6	District of Alaska-----	1
Arkansas-----	7	Philippine Islands-----	1
California-----	63	Montana-----	2, 883
Colorado-----	16	Nebraska-----	32
District of Columbia-----	21	Nevada-----	1
Florida-----	7	New Jersey-----	9
Georgia-----	18	New York-----	131
Idaho-----	35	North Carolina-----	2
Illinois-----	343	Texas-----	18
Indiana-----	29	Utah-----	8
Iowa-----	106	Virginia-----	2
Kansas-----	51	North Dakota-----	94
Kentucky-----	35	Ohio-----	80
Louisiana-----	1	Oklahoma-----	13
Maryland-----	2	Oregon-----	51
Massachusetts-----	28	Pennsylvania-----	89
Michigan-----	28	Rhode Island-----	3
Minnesota-----	401	Washington-----	248
Mississippi-----	5	West Virginia-----	3
Missouri-----	148	Wisconsin-----	51
South Carolina-----	1	Wyoming-----	6
South Dakota-----	19		

FOREIGN COUNTRIES.

Alberta-----	17	Mexico-----	5
British Columbia-----	18	New Zealand-----	1
China-----	6	Nova Scotia-----	1
England-----	5	Norway-----	1
France-----	1	Ontario-----	1
Germany-----	3	Scotland-----	2
India-----	1	Quebec-----	1
Ireland-----	3		

John E. Lewis, proprietor of the Hotel Glacier, situated on privately owned land at the head of Lake McDonald, reports that he cared for 3,227 guests during the season.

F. C. Geduhn, operating the Park Hotel at the head of Lake McDonald, states that 750 persons registered at his hotel during the season.

Three hundred and nine automobiles and one motorcycle entered the park during the season. At the time of the Elks' convention in Kalispell on July 6, 7, and 8 the license fee for entering the park with motor cars was suspended, and 33 cars registered during those three days.

The following shows the number of visitors cared for at Great Northern camps: Two Medicine, 389; Cut Bank, 364; St. Mary's camp, 500; Narrows camp, 319; Lake McDermott, 258; Gunsight, 674; and Sperry Glacier, 641.

FIRES.

As the season was unusually wet the park has been very fortunate in the matter of forest fires. Two small blazes originated in Ranger Brewster's district in the North Fork country. They were quickly extinguished, and the area burned over will not exceed one-half acre each. On September 30 Ranger Graves reported that a fire on park lands near Lubec along the Great Northern Railway

had burned over about 20 acres before it was put out. This latter fire was discovered by a forest guard of the Lewis and Clark National Forest who had it under control when the park ranger arrived.

ACCIDENTS.

On July 30, 1912, the date of the starting of the shingle machine in connection with the sawmill, Ranger Sloan had two fingers badly lacerated by the shingle saw.

Ranger Cosley, under date of July 6, when returning to his station after a conference at headquarters, attempted Ahearn Pass. While crossing the pass a snow-covered ledge broke off and he narrowly escaped with his life. The horse he was riding and his pack horse were instantly killed, falling hundreds of feet into the canyon beneath.

But one accident to visitors to the park was reported to the office. A tourist suffered a sprained ankle which occurred at one of the permanent camps under circumstances, however, which might have prevailed anywhere. This latter item would serve to call attention to the condition of the trails and the care of those escorting tourists through the park.

LIVE STOCK.

In the North Fork country a small herd of cattle was removed from park lands and the owner of the stock warned to keep them off the reservation. Small bands of stray horses from the Blackfeet Indian Reservation which crossed the park lines were driven back to the Indian lands.

A band of 2,000 sheep was permitted to graze for 24 hours on park lands near Summit Station pending the arrival of cars on the Great Northern Railway.

GAME.

From the best knowledge and observations the moose seem to be increasing in the region of the North Fork of the Flathead River. Deer are largely decreased since the winter of 1911-12, which was extremely severe, with unusually heavy snowfall. No statement can be made as to increase or decrease in the number of elk, goats, and sheep, although the last named would not seem to be so numerous. Every effort has been made to impress visitors to the park and citizens of the State of the desirability of protecting the game within the borders of the park, and the majority of persons seem to be heartily in sympathy with such movement. Animals destructive of game life are not large in number; there are a few pumas, a number of coyotes, and, so far as can be learned, no wolves within the park limits.

CONCESSIONS.

Concessions granted from Sept. 1, 1911, to Oct. 1, 1912, for the period of one year each.

Name.	Character.	Amount charged.
B. C. Carruth.....	Residence.....	\$25.00
J. M. Gruber.....	do.....	25.00
Mrs. J. M. Gruber.....	do.....	25.00
L. F. Easton.....	do.....	25.00
J. S. Pomeroy.....	do.....	25.00
F. H. Kiser.....	do.....	10.00
Mrs. George Flowers.....	do.....	10.00
James Brown.....	do.....	10.00
Dr. D. Braden Kyle.....	do.....	25.00
Chas. W. Pomeroy.....	do.....	25.00
Miller & Cable.....	do.....	10.00
Ada M. Swank.....	do.....	25.00
Arthur C. Green.....	do.....	25.00
Will M. Mattler.....	do.....	25.00
E. C. Carruth (permit renewed).....	do.....	25.00
N. A. Forsyth.....	do.....	10.00
Eugene Corrie.....	do.....	10.00
E. S. Matthews, 25 horses.....	Saddle and pack transportation.....	25.00
Ernest Lanneau, 25 horses.....	do.....	25.00
W. A. Brewster, 100 horses.....	do.....	100.00
Thomas Dawson, 100 horses.....	do.....	100.00
Josiah Rogers, 75 horses.....	do.....	75.00
Horace J. Clark, 25 horses.....	do.....	25.00
Isaac F. Higgins, 25 horses.....	do.....	25.00
Ralph McLain, 25 horses.....	do.....	25.00
Henry R. Norris, 25 horses.....	do.....	25.00
George Miller, 25 horses.....	do.....	25.00
J. B. Monroe, 25 horses.....	do.....	25.00
Fred Big Top, 25 horses.....	do.....	25.00
Denney & Kelly.....	Boat transportation, 3 boats on Lake McDonald.....	150.00
Great Northern Ry. Co.....	Boat transportation, 2 boats, St. Marys Lake.....	50.00
John Weightman.....	Stage transportation, Belton-Lake McDonald.....	74.00
Horace J. Clark.....	Stage transportation, Midvale-St. Marys.....	10.00
W. A. Brewster.....	do.....	20.00
L. T. Aubrey.....	Stage transportation, St. Marys-McDermott Lakes.....	10.00
W. A. Brewster.....	Automobile transportation, Midvale-St. Marys.....	37.50
John Weightman.....	Freight transportation, Belton-Lake McDonald.....	20.00
Great Northern Ry. Co.....	Erection snow sheds.....	113.20
Do.....	Gravel pit.....	806.60
F. H. Kiser.....	Photographic.....	50.00
E. E. Dow.....	Telephone, 4 months.....	16.00
Do.....	Telephone, 3 months.....	12.00
Frank Kelly.....	Telephone, 4 months.....	16.00
W. L. Adair.....	do.....	16.00
J. M. Gruber.....	Telephone, 3 months.....	12.00
Great Northern Ry. Co.....	Telephone, 1 month 8 days.....	5.20
John E. Lewis.....	Telephone, 3 months.....	12.00
Miss E. Ferguson.....	do.....	12.00
Charles Howes.....	Telephone, 2 months.....	8.00
W. A. Brewster.....	do.....	8.00
John Weightman.....	2 phones, 1 month.....	8.00
J. M. Hyde.....	Sale of dead and down timber.....	228.77
Olson & Peterson.....	do.....	12.00
G. C. Smiley.....	do.....	3.20
J. K. Miller.....	Sale of logs.....	13.50
John E. Lewis.....	Permanent camp.....	25.00
Great Northern Ry. Co.....	do.....	

NOTE.—The charge to be exacted for the permanent camps has not as yet been determined.

Automobile licenses issued:

16 season licenses, at \$5.....	\$80.00
198 single trip licenses, at \$1.....	198.00
1 motor cycle license, at \$1.....	1.00

The Great Northern Railway Co. was permitted to construct a telephone system on the east side of the mountains under restrictions laid down by the department.¹

Permits to cut hay on shares were issued to several persons.

¹ Their lines connect Midvale with all east-side camps and aggregate about 73 miles.

John Hazzard was allowed to run a small gasoline boat on Waterton Lake without charge with the stipulation that he carry the superintendent or his authorized representative free of charge when on park business.

Schedule of rates charged for service in Glacier National Park.

Weightman Stage Line, operating between Belton and Lake McDonald: Passenger fare, one way, \$0.50; trunks and baggage, each way, \$0.50; hand baggage free.

Denney & Kelly, operating boats on Lake McDonald: Fare one way, \$0.75; round trip, \$1.25; trunks and baggage, \$0.50; 1,000 pounds or less freight, \$0.25 per hundredweight; over 1,000 pounds, 20 cents per hundredweight.

Charges for saddle and pack-horse transportation: Licensed guide in charge, per day, \$3.50; cook per day, \$3; saddle and pack horses, 1 to 5 days, per day, \$2; over 5 to 10 days, per day, \$1.50; more than 10 days, per day, \$1.

Charges maintained at Great northern camps: \$3 per day, \$0.75 per meal.

Automobile transportation, Midvale-St. Mary's:

	Round trip.	One way.
4 or more passengers.....each	\$5. 00	\$4. 00
3 passengers.....do	6. 65	5. 35
2 passengers.....do	10. 00	8. 00
1 passenger.....do	20. 00	16. 00

Expenditures on 1911-12 appropriation of \$69,200.

Employees' salaries.....	\$22, 957. 33
Printing park administrative map.....	740. 00
Destroying insects infesting timber.....	200. 00
Framing park pictures.....	52. 00
Rock crusher and motor boat.....	3, 265. 94
Photographic map of park.....	2. 20
Printing and binding.....	19. 77
Road and trail construction.....	28, 649. 31
Construction of telephone lines.....	2, 314. 14
Rental of log cabins.....	561. 00
Construction of docks.....	536. 42
Team, wagon, and harness.....	350. 00
Salary and expenses of E. S. Bruce, expert lumberman, in examining timber preparatory to determination sale thereof.....	346. 86
Transportation and subsistence.....	1, 731. 53
Miscellaneous supplies, 2 typewriters, United States flags, etc.....	197. 33
Purchase and installation of sawmill at Fish Creek.....	2, 558. 03
Logging operations.....	1, 799. 72
Construction cabins and temporary office at Fish Creek, etc.....	571. 89
For plans, proposed construction administration buildings, salary and expenses of architect and engineer, advertising, etc.....	1, 166. 92
Advertising construction road from Divide Creek, in Blackfoot Indian Reservation, to St. Marys Lake, in Glacier Park.....	7. 20
Freight charges.....	15. 52
Telegraph charges.....	113. 58
Purchase of wood for fuel.....	47. 69
Repairing and painting motor boat.....	75. 00
Purchase of telephone line.....	300. 00
Flooring approach to Middle Fork Bridge.....	30. 24
Constructing landing dock and anchoring floating dock.....	100. 25
Purchase of rowboat.....	38. 20
Miscellaneous charges: Preparation and reproduction of park maps, township plats, park views, etc.; salaries of persons employed fighting forest fires, etc.....	349. 58
	69, 097. 65
Balance held for payment outstanding obligations not yet presented for settlement.....	102. 35
	69, 200. 00

RECOMMENDATIONS.

I concur most emphatically in the recommendation of my predecessor that Congress comply with the request of the State of Montana contained in the act of the State legislature ceding jurisdiction and formally notify the governor of Montana that its tender is accepted. Too much emphasis can not be laid on this matter, and I sincerely hope that during the next session of Congress the Pray bill, or one similar thereto, will be enacted into law. On account of the failure of the last Congress to pass the Pray bill many citizens of the State take the position that the Federal Government exercises no control over the park lands and have openly declared their intentions of hunting in the park during the open season in Montana, and considerable difficulty is looked for this fall in protecting the game. Until this matter is disposed of the superintendent will be seriously hampered in his administration of the park, and at the risk of repetition I would urgently recommend that the department bend all efforts to secure the passage of a bill accepting jurisdiction.

It would greatly add to the economical and advantageous administration of the park if the Government would acquire all private holdings within its boundaries at the earliest possible date. Private holdings make difficult the enforcement of game laws and the location of roads and trails. In this connection I would call particular attention to the desirability of the Government obtaining control through ownership of the district between Belton and Lake McDonald through which the macadam road has been constructed. Almost all of this land is now held in private ownership, and the road, now especially attractive through its surroundings of spruce, fir, cedar, and tamarack, would be practically ruined if this land is lumbered. The present largest holder assures me that he will never sell the timber, but can not vouch for what may happen in case of his failure or death.

I concur in the recommendations of my predecessor in the following items:

Construction of a road around Lake McDonald; construction of an adequate bridge of generous proportions and artistic design across the Middle Fork of the Flathead River from Belton Station to the southern end of the macadam road; a larger and more complete equipment of pack and saddle animals and an increase in the number of rangers.

In order that there may be a more complete registration of the visitors to the park and that more prompt decision may be reached with regard to matters on the east side, as well as a better control of rangers and tourists, I would urgently recommend the establishment of a secondary or subheadquarters on the eastern side of the mountains, this office to be in charge of a competent and trained official.

Several permanent ranger stations should be established equipped with all essentials and maintained on the boundaries of the park as well as two or more well in the interior to assist in the movement, care, and convenience of visitors and the supervision over concessionaires. It is anticipated that there will be a large increase of visitors during the season of 1913 owing to the wide publicity which has been given the attractions and accommodations in the park.

I would recommend the construction of a road up McDonald Creek from McDonald Lake to Waterton Lake and a road across the main range of the Rockies from McDonald Creek to St. Marys, over the divide near Mount Coburn, and down the North Fork of St. Marys River. The road to be of a suitable width, not less than 16 feet exclusive of gutters.

A road of primary importance is one that should be run from Fish Creek, on Lake McDonald, up the valley of the North Fork of the Flathead River to the Canadian boundary, and a connecting road via the north shore of Bowman Lake and Browns Pass, Olson Creek, to connect with the road to Waterton Lake.

A very picturesque route for a road and one which to my mind would be largely used would parallel the southern boundary of the park and the Great Northern Railway and greatly increase the travel between eastern and western entrances. From an engineering standpoint this road might be most advantageously located outside of the park boundary for a considerable distance. In this connection I will state that there is no wagon route across the mountains north of the Lewis and Clark Pass, which is considerably more than 100 miles south of the Canadian boundary.

The telephone system should be extended so that each of the present and future ranger stations be connected with headquarters.

A very important recommendation is that relating to headquarters. The location of a site for such headquarters should be immediately and finally determined and adequate buildings constructed. In my opinion these buildings can be built of logs and of a type that would be both artistic and in keeping with the surroundings and wholly efficient for the transaction of public business.

I would also urgently recommend the extension of the eastern boundary of the park so as to include that portion of Flattop and Point Mountains lying between lower St. Marys Lake and River and Swiftcurrent Creek. The game use this ridge for fall and winter range and a considerable number is killed each year. For the same reason as cited above that portion of the Indian reservation drained by Lee and Kennedy Creeks lying between the present park boundary and the line between townships 14 and 15 west should be added to the park lands.

The area between Divide Creek-St. Mary Road and the present boundary should be under park administration in order to enforce park rules and adequately protect the park game.

Respectfully submitted.

R. H. CHAPMAN,
Acting Superintendent.

THE SECRETARY OF THE INTERIOR.

APPENDIX.

ACT ESTABLISHING GLACIER NATIONAL PARK.

AN ACT To establish "The Glacier National Park" in the Rocky Mountains south of the international boundary line, in the State of Montana, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the tract of land in the State of Montana particularly described by metes and bounds as follows, to wit: Commencing at a point on the international boundary between the United States and the Dominion of Canada at the middle of the Flathead River; thence following southerly along and with the middle of the Flathead River to its confluence with the Middle Fork of the Flathead River; thence following the north bank of said Middle Fork of the Flathead River to where it is crossed by the north boundary of the right of way of the Great Northern Railroad; thence following the said right of way to where it intersects the west boundary of the Blackfeet Indian Reservation; thence northerly along said west boundary to its intersection with the international boundary; thence along said international boundary to the place of beginning, is hereby reserved and withdrawn from settlement, occupancy, or disposal under the laws of the United States, and dedicated and set apart as a public park or pleasure ground for the benefit and enjoyment of the people of the United States under the name of "The Glacier National Park;" and all persons who shall locate or settle upon or occupy the same, or any part thereof, except as hereinafter provided, shall be considered trespassers and removed therefrom: *Provided*, That nothing herein contained shall affect any valid existing claim, location, or entry under the land laws of the United States or the rights of any such claimant, locator, or entryman to the full use and enjoyment of his land: *Provided further*, That rights of way through the valleys of the North and Middle Forks of the Flathead River for steam or electric railways may be acquired within said Glacier National Park under filings or proceedings heretofore or hereafter made or instituted under the laws applicable to the acquisition of such rights over or upon the unappropriated public domain of the United States, and that the United States Reclamation Service may enter upon and utilize for flowage or other purposes any area within said park which may be necessary for the development and maintenance of a Government reclamation project: *And provided further*, That no lands within the limits of said park hereby created belonging to or claimed by any railroad or other corporation now having or claiming the right of indemnity selection by virtue of any law or contract whatsoever shall be used as a basis for indemnity selection in any State or Territory whatsoever for any loss sustained by reason of the creation of said park.

SEC. 2. That said park shall be under the exclusive control of the Secretary of the Interior, whose duty it shall be, as soon as practicable, to make and publish such rules and regulations not inconsistent with the laws of the United States as he may deem necessary or proper for the care, protection, management, and improvement of the same, which regulations shall provide for the preservation of the park in a state of nature so far as is consistent with the purposes of this act, and for the care and protection of the fish and game within the boundaries thereof. Said Secretary may, in his discretion, execute leases to parcels of ground not exceeding ten acres in extent at any one place to any one person or company for not to exceed twenty years, when such ground is necessary for the erection of buildings for the accommodation of visitors, and to parcels of ground not exceeding one acre in extent and for not to exceed twenty years to persons who have heretofore erected or whom he may hereafter authorize to erect summer homes or cottages; he may also sell and permit the removal of such matured or dead or down timber as he may deem necessary or advisable for the protection or improvement of the park.

Approved, May 11, 1910.

ACT OF MONTANA LEGISLATURE CEDING JURISDICTION.

[Senate bill No. 46.]

AN ACT To cede jurisdiction over the Glacier National Park to the United States, and for other purposes.

Be it enacted by the Legislative Assembly of the State of Montana:

SECTION 1. That exclusive jurisdiction shall be, and the same is hereby, ceded to the United States over and within all the territory which is now or may hereafter be included in that tract of land in the State of Montana set aside by the act of Congress approved May eleventh, nineteen hundred and ten, for the purposes of a national park, and known and designated as "The Glacier National Park," saving, however, to the said State the right to serve civil or criminal process within the limits of the aforesaid park in any suits or prosecution for or on account of rights acquired, obligations incurred, or crimes committed in said State, but outside of said park, and saving further to the said State the right to tax persons and corporations, their franchises and property, on the lands included in said park: *Provided, however,* That jurisdiction shall not vest until the United States, through the proper officers, notifies the governor of this State that they assume police or military jurisdiction over said park.

SEC. 2. All acts and parts of acts in conflict with this act are hereby repealed.

SEC. 3. This act shall be in force and effect from and after its passage and approval by the governor.

W. R. ALLEN,
President of the Senate.

W. W. McDOWELL,
Speaker of the House.

Approved, February 17, 1911.

EDWIN L. NORRIS, *Governor.*

Filed February 17, 1911, 4.15 p. m.

A. N. YODER, *Secretary of State.*

A BILL (H. R. 1679) PENDING BEFORE CONGRESS TO ACCEPT THE CESSION BY THE STATE OF MONTANA OF EXCLUSIVE JURISDICTION OVER THE LANDS EMBRACED WITHIN THE GLACIER NATIONAL PARK, AND FOR OTHER PURPOSES.¹

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the provisions of the act of the Legislature of the State of Montana, approved February seventeenth, nineteen hundred and eleven, ceding to the United States exclusive jurisdiction over the territory embraced within the Glacier National Park, are hereby accepted, and sole and exclusive jurisdiction is hereby assumed by the United States over such territory, saving, however, to the said State the right to serve civil or criminal process within the limits of the aforesaid park in suits or prosecution for or on account of rights acquired, obligations incurred, or crimes committed in said State, but outside of said park, and saving further to the said State the right to tax persons and corporations, their franchises and property, on the lands included in said park. All the laws applicable to places under the sole and exclusive jurisdiction of the United States shall have force and effect in said park. All fugitives from justice taking refuge in said park shall be subject to the same laws as refugees from justice found in the State of Montana.

SEC. 2. That said park shall constitute a part of the United States judicial district of Montana, and the district court of the United States in and for said district shall have jurisdiction of all offenses committed within said boundaries.

SEC. 3. That if any offense shall be committed in the Glacier National Park, which offense is not prohibited or the punishment is not specifically provided for by any law of the United States, the offender shall be subject to the same punishment as the laws of the State of Montana in force at the time of the commission of the offense may provide for a like offense in said State; and no subsequent repeal of any such law of the State of Montana shall affect any prosecution for said offense committed within said park.

SEC. 4. That all hunting or the killing, wounding, or capturing at any time of any bird or wild animal, except dangerous animals when it is necessary to prevent them from destroying human lives or inflicting personal injury, is prohibited within the limits of said park; nor shall any fish be taken out of the waters of the park in any other way than by hook and line, and then only at such seasons and in such times and manner as may be directed by the Secretary of the Interior. That the Secretary of the Interior shall make and publish such rules and regulations as he may deem necessary and proper for the management and care of the park and for the protection of the property therein, especially for the preservation from injury or spoliation of all timber, mineral deposits other than those legally located prior to the passage of the act of May eleventh, nineteen hundred and ten (Thirty-sixth Statutes, page three hundred and fifty-four), natural curiosities, or wonderful objects within said park, and for the protection of the animals and birds in the park from capture or destruction, and to prevent their being frightened or driven from the park; and he shall make rules and regulations governing the taking of fish

¹ Introduced April 5, 1912; reported May 31, 1912.

from the streams or lakes in the park. Possession within said park of the dead bodies, or any part thereof, of any wild bird or animal shall be prima facie evidence that the person or persons having the same are guilty of violating this act. Any person or persons, or stage or express company, or railway company, receiving for transportation any of said animals, birds, or fish so killed, caught, or taken, shall be deemed guilty of a misdemeanor and shall be fined for every such offense not exceeding three hundred dollars. Any person found guilty of violating any of the provisions of this act, or any rule or regulation that may be promulgated by the Secretary of the Interior with reference to the management and care of the park, or for the protection of the property therein, or the preservation from injury or spoliation of timber, mineral deposits, other than those legally located prior to the passage of the act of May eleventh, nineteen hundred and ten (Thirty-sixth Statutes, page three hundred and fifty-four), natural curiosities, or wonderful objects within said park, or for the protection of the animals, birds, or fish in the park, shall be deemed guilty of a misdemeanor and shall be subject to a fine of not more than one thousand dollars, or imprisonment not exceeding two years, or both, and be adjudged to pay all costs of the proceedings.

SEC. 5. That all guns, traps, teams, horses, or means of transportation of every nature or description used by any person or persons within said park limits when engaged in killing, trapping, ensnaring, or capturing such wild beasts, birds, or wild animals shall be forfeited to the United States and may be seized by the officers in said park and held pending the prosecution of any person or persons arrested under charge of violating the provisions of this act, and upon conviction under this act of such person or persons using said guns, traps, teams, horses, or other means of transportation, such forfeiture shall be adjudicated as a penalty in addition to the other punishment provided in this act. Such forfeited property shall be disposed of and accounted for by and under the authority of the Secretary of the Interior.

SEC. 6. That any person who shall, within the said above-mentioned park, commit any damage, injury, or spoliation to or upon any building, fence, hedge, gate, guidepost, tree, wood, underwood, timber, garden, crops, vegetables, plants, land, springs, mineral deposits other than those legally located prior to the passage of the act of May eleventh, nineteen hundred and ten (Thirty-sixth Statutes, page three hundred and fifty-four), natural curiosities, or other matter or thing growing or being thereon, or situated therein, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to a fine of not more than five hundred dollars or imprisonment for not more than twelve months, or both, in the discretion of the court.

SEC. 7. That the United States District Court for the District of Montana shall appoint a commissioner, who shall reside in the park, and who shall have jurisdiction to hear and act upon all complaints made of any violations of law or of the rules and regulations made by the Secretary of the Interior for the government of the park and for the protection of the animals, birds, and fish, and objects of interest therein, and for other purposes authorized by this act.

Such commissioner shall have power, upon sworn information, to issue process in the name of the United States for the arrest of any person charged with the commission of any misdemeanor, or charged with a violation of the rules and regulations, or with a violation of any of the provisions of this act prescribed for the government of said park and for the protection of the animals, birds, and fish in said park, and to try the person so charged, and, if found guilty, to impose punishment and to adjudge the forfeiture prescribed.

In all cases of conviction an appeal shall lie from the judgment of said commissioner to the United States District Court for the District of Montana, and the United States district court in said district shall prescribe the rules of procedure and practice for said commissioner in the trial of cases and for appeal to said United States district court.

SEC. 8. That any such commissioner shall also have power to issue process as hereinbefore provided for the arrest of any person charged with the commission, within said boundaries, of any criminal offense not covered by the provisions of section six of this act, to hear the evidence introduced, and if he is of opinion that probable cause is shown for holding the person so charged for trial, shall cause such person to be safely conveyed to a secure place of confinement, within the jurisdiction of the United States District Court for the District of Montana, and certify a transcript of the record of his proceedings and the testimony in the case to said court, which court shall have jurisdiction of the case: *Provided*, That the said commissioner shall grant bail in all cases bailable under the laws of the United States or of said State.

SEC. 9. That all process issued by the commissioner shall be directed to the marshal of the the United States for the district of Montana, but nothing herein contained shall be so construed as to prevent the arrest by any officer or employee of the Government, or any person employed by the United States in the policing of said reservation, within said boundaries, without process, of any person taken in the act of violating the law or this act, or the regulations prescribed by said Secretary as aforesaid.

SEC. 10. That the commissioner provided for in this act shall be paid an annual salary of one thousand five hundred dollars, payable quarterly: *Provided*, That the said commissioner shall reside within the exterior boundaries of said Glacier National Park, at a place to be designated by the court making such appointment; *And provided further*, That all fees, costs, and expenses collected by the commissioner shall be disposed of as provided in sections ten and eleven of this act.

SEC. 11. That all fees, costs, and expenses arising in cases under this act and properly chargeable to the United States shall be certified, approved, and paid as are like fees, costs, and expenses in the courts of the United States.

SEC. 12. That all fines and costs imposed and collected shall be deposited by said commissioner of the United States or the marshal of the United States collecting the same with the clerk of the United States District Court for the District of Montana.

SEC. 13. That the Secretary of the Interior shall notify, in writing, the governor of the State of Montana of the passage and approval of this act.

GENERAL REGULATIONS OF MARCH 30, 1912.

The following rules and regulations for the government of the Glacier National Park are hereby established and made public, pursuant to authority conferred by the act of Congress approved May 11, 1910:

1. It is forbidden to injure or disturb in any manner any of the mineral deposits, natural curiosities, or wonders on the Government lands within the park.

2. It is forbidden to cut, without a permit from the Secretary of the Interior or his authorized representative, any timber growing on the park lands; it is also forbidden to injure any growing timber or deface or injure any Government property. Camping parties will be allowed to use dead or fallen timber for fuel. When felling timber, stumps must not be left higher than 12 inches from the ground.

3. Fire should be lighted only when necessary and completely extinguished when not longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

4. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation, and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof. On arrival at the first station of the park guard, parties having firearms, traps, nets, seines, or explosives will turn them over to the officer in charge of the station, taking his receipt for them. They will be returned to the owners on leaving the park.

5. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

All fish less than 8 inches in length should at once be returned to the water with the least damage possible to the fish. Fish that are to be retained must be at once killed by a blow on the back of the head or by thrusting a knife or other sharp instrument into the head. No person shall catch more than 20 fish in one day.

6. No person will be permitted to reside permanently, engage in any business, or erect buildings, etc., upon the Government lands in the park without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion. No pack trains will be allowed in the park unless in charge of a duly registered guide.

7. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; the boundaries of such lands, however, must be determined, and marked and defined, so that they may be readily distinguished from the park lands. While no limitations or conditions are imposed upon the use of such private lands so long as such use does not interfere with or injure the park, private owners must provide against trespass by their stock or cattle, or otherwise, upon the park lands, and all trespasses committed will be punished to the full extent of the law. Stock may be taken over the park lands to patented private lands with the written permission and under the supervision of the superintendent, but such permission and supervision are not required when access to such private lands is had wholly over roads or lands not owned or controlled by the United States.

8. Allowing the running at large, herding, or grazing of cattle or stock of any kind on the Government lands in the park, as well as the driving of such stock or cattle over same, is strictly forbidden, except where authority therefor has been granted by the superintendent. All cattle or stock found trespassing on the park lands will be impounded and disposed of as directed in regulations approved March 30, 1912.

9. No drinking saloon or barroom will be permitted upon Government lands in the park.

10. Private notices or advertisements shall not be posted or displayed on the Government lands within the reservation, except such as may be necessary for the convenience and guidance of the public.

11. It is forbidden to carve or write names or otherwise deface any of the posts, signboards, platforms, seats, railings, steps, boulders, trees, or structures of any kind in the park.

12. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who may violate any of the foregoing rules, will be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

No lessee or licensee shall retain in his employ any person whose presence in the park shall be deemed and declared by the superintendent to be subversive of the good order and management of the reservation.

13. The superintendent designated by the Secretary is hereby authorized and directed to remove all trespassers from the Government lands in the park and enforce these rules and regulations and all the provisions of the act of Congress aforesaid.

REGULATIONS OF MARCH 30, 1912, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK.

Horses, cattle, or other domestic live stock running at large or being herded or grazed in the Glacier National Park without authority from the Secretary of the Interior, will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notices of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of

an animal thus impounded may, at any time before the sale thereof, reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded shall not be reclaimed within 30 days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent after 10 days' notice, to be given by posting notices in six public places in the park and two public places outside the park, and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof, shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership, and if not so claimed within six months from the date of sale such proceeds shall be turned into the Glacier National Park Fund.

The superintendent shall keep a record in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, the name and address of the purchaser, the amount for which each animal was sold and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent will, in each instance, make every reasonable effort to ascertain the owner of animals impounded and to give actual notice thereof to such owner.

REGULATIONS OF MARCH 30, 1912, GOVERNING THE ADMISSION OF AUTOMOBILES AND MOTOR CYCLES.

Pursuant to authority conferred by the act of May 11, 1910, setting aside certain lands in the State of Montana as a public park, the following regulations governing the admission of automobiles into the Glacier National Park are hereby established and made public:

1. No automobiles will be permitted within the metes and bounds of the Glacier National Park unless the owner thereof secures a written permit from the superintendent or his representative.

2. Applications for permits must show: (a) Name of owner, (b) number of machine, (c) name of driver, and (d) inclusive dates for which permit is desired, not exceeding one year, and be accompanied by a fee of \$1 for a single round trip through the park, or a fee of \$5 for each machine per annum.

Permits must be presented to the superintendent or his authorized representatives at the park entrance on the Government road. The permittee will not be allowed to do a transportation business in the park without a special license therefor from the Secretary of the Interior.

3. The use of automobiles will be permitted on the Government road from Belton, Mont., to the administrative headquarters at Lake

McDonald between the hours of 7 a. m. and 8.30 p. m., but no automobile shall enter the park, or leave Lake McDonald in the direction of Belton, later than 8 p. m.

4. When teams, saddle horses, or pack trains approach, automobiles will take position on the outer edge of the roadway, regardless of the direction in which they are going, taking care that sufficient room is left on the inside for horses to pass.

5. Automobiles will stop when teams, saddle horses, or pack trains approach, and remain at rest until they have passed or until the drivers are satisfied regarding the safety of their horses.

6. Speed will be limited to 6 miles per hour, except on straight stretches where approaching teams, saddle horses, and pack trains will be visible, when, if none are in sight, this speed may be increased to the rate indicated on signboards along the road; in no event, however, shall it exceed 15 miles per hour.

7. Signal with horn will be given at or near every bend to announce to approaching drivers the proximity of a machine.

8. Horses have the right of way, and automobiles will be backed or otherwise handled, as necessary, so as to enable horses to pass with safety.

9. All permits granted at any time when automobiles can enter the park will expire on December 31 of the year of issue.

10. These rules are also applicable to motor cycles, which may use only the roads herein mentioned, on payment of a fee of \$1 for each machine per annum; permits issued therefor shall expire on December 31 of the year of issue.

11. Violation of any of the foregoing rules, or the general regulations for the government of the park, will cause the revocation of permit; will subject the owner of the automobile or motor cycle to any damages occasioned thereby and to ejection from the reservation, and be cause for refusal to issue a new permit to the owner without prior sanction in writing from the Secretary of the Interior.



REPORT ON PLATT AND WIND CAVE NATIONAL
PARKS, SULLYS HILL PARK, CASA GRANDE
RUIN, MUIR WOODS, PETRIFIED FOREST,
AND OTHER NATIONAL MONUMENTS,
INCLUDING LIST OF BIRD
RESERVES.

REPORT ON PLATT AND WIND CAVE NATIONAL PARKS SULLYS HILL PARK, CASA GRANDE RUIN, MUIR WOODS, PETRIFIED FOREST, AND OTHER NATIONAL MONUMENTS, TOGETHER WITH LIST OF BIRD RESERVES.

PLATT NATIONAL PARK.

By the acts of Congress of July 1, 1902 (32 Stat., 641), and April 21, 1904 (33 Stat., 220), 629.33 and 218.89 acres, respectively, at the town of Sulphur, Okla. (then Ind. Ter.), were segregated as the "Sulphur Springs Reservation," which designation, by joint resolution approved June 29, 1906, was changed to "Platt National Park."

The park, with a total area of 848.22 acres, extends in irregular form a distance of approximately 3 miles from northeast to southwest along Travertine Creek, including a portion of Rock Creek, which empties into the former, and it has a circuit of 9 miles.

Within the park are 33 known mineral and 2 nonmineral springs. The principal groups are the Bromide and Bromide-Sulphur Springs in the southwestern part of the park, Beach and Pavilion Springs in the northwestern corner, and the Wilson group in the southern part. Sulphur springs predominate, but there are also bromide, soda, and iron varieties. The Antelope and Buffalo Springs, nonmineral in character, are situated at the extreme northeastern end of the park with an elevation of 1,083 feet above sea level and an approximate discharge of 5,000,000 gallons daily into Travertine Creek.

The appropriation for the care and maintenance of the park for the fiscal year 1912 was increased by Congress to \$10,000, as against the appropriation of \$5,000 for the preceding year. The superintendent of the park has accordingly been enabled to make numerous improvements. The more important springs have been walled with a view to confining their flow, new cement approaches have been installed, and necessary repairs made to pavilions. The roads in the park have been greatly improved by grading, graveling, and installation of culverts, drains, and retaining walls. Cement sidewalk to the extent of 4,466 square feet has been laid, and cement stairway built upon the slope near Bromide Spring. Extensive repairs have been made to the park bridges and much new fencing built. Repairs have also been made to the buildings in the park, and with exception of the building used for administrative purposes they are in a generally satisfactory condition. A new barn has been constructed in the park, farming machinery bought, and a team of mules purchased, ample forage for which is grown in the park. Sixty young trees have been planted.

One permit for transportation of passengers in and through the park, using a two-seated vehicle, was issued, as were several other permits for sale of water, license fees being exacted in each case. The total receipts from all sources during the year were \$165.50.

Seven hundred and thirty-four campers made use of camping grounds in the park for more than three days. The park records show that 89,371 persons visited Bromide Springs during the year. Many of these were residents of Sulphur and were counted each time they visited the springs. From the best information obtainable, however, the actual number of individuals who visited the park, inclusive of residents of Sulphur, was about 31,000.

Two thousand head of cattle were driven through the park, in changing them from one pasture to another, or for getting them to available watering places, or for shipment to market.

In the act making appropriation for the current and contingent expenses of the Bureau of Indian Affairs approved August 24, 1912, provision was made as follows:

For the construction of a sanitary sewer system in Platt National Park, Okla., to be expended under the direction of the Secretary of the Interior, seventeen thousand five hundred dollars: *Provided*, That the said sum shall be available whenever a like amount is appropriated and made available by the town of Sulphur, Okla., for the same purposes: *Provided further*, That whenever said appropriation is made by the town of Sulphur, Okla., the entire amount, or so much thereof as may be necessary, of the total appropriation made by this act and the town of Sulphur, Okla., shall be expended under the direction of the Secretary of the Interior.

The matter was brought to the attention of the municipal authorities of Sulphur, and thereafter an issue of bonds was authorized by the town with a view to procuring the funds necessary to aid in the construction of the sewer. The above-mentioned amount having been deposited with the department, an inspector was thereupon detailed to make examination of the park with a view to installation of the sewer provided for by the act if found practicable with the money available for the purpose.

REGULATIONS OF JUNE 10, 1908.

Pursuant to the authority conferred by the acts of Congress approved July 1, 1902 (32 Stat., 656), April 21, 1904 (33 Stat., 220), and the Oklahoma statehood act of June 16, 1906 (34 Stat., 272), the following rules and regulations for the government of the Platt National Park (formerly Sulphur Springs Reservation), in Oklahoma, are hereby established and made public:

1. It is forbidden to injure in any manner any of the springs, mineral deposits, or natural features within the park.
2. It is forbidden to cut or injure any timber or plants growing on the park lands, or to deface or injure any Government property.
3. No camping shall be permitted within 1,000 feet of any spring, nor upon any land except such as may be specifically designated for that purpose by the superintendent. Fires shall not be lighted except by the express permission of the superintendent; when so allowed, campers shall use only dead or fallen timber for fuel, and the utmost care must be exercised at all times to avoid setting fire to the timber and grass.

4. It is forbidden for any person to deposit garbage or refuse upon the park lands, except at places designated for that purpose by the superintendent, or to contaminate any of the springs or streams therein, or to divert or conduct the waters of such springs or streams from the natural or regular course.

5. No person shall remove from any of the bromide, iron, or soda springs more than 1 gallon of water in any one day, nor remove from any of the other springs more than 5 gallons in any one day, nor shall any water be taken therefrom for commercial purposes, except in pursuance of a license issued by the Secretary of the Interior. Whenever in his judgment the circumstances warrant, the superintendent may prohibit the use of the waters of any of the springs; the park other than for immediate drinking purposes at such springs, the facts in such case to be reported to the Secretary of the Interior.

6. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof.

7. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited. Fishing for purposes of merchandise or profit is forbidden. Fishing may be prohibited by order of the superintendent in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

8. No person will be permitted to reside permanently, engage in any business, or erect buildings or other improvements in the park, without permission, in writing, from the Secretary of the Interior.

9. The herding, grazing, or otherwise trespassing of cattle or loose stock of any kind within the park is strictly forbidden. Stock or cattle may be driven across the park, but must be confined to the roads and kept in motion under competent care while in the reservation.

10. No vehicles will be permitted to travel through the park except upon the roads designated for such traffic by the superintendent, and driving or riding over roads or bridges at a high rate of speed is prohibited.

11. Private notices or advertisements shall not be posted or displayed within the park, except such as may be necessary for the convenience and guidance of the public.

12. The sale of intoxicating liquors in the park is strictly forbidden.

13. No gambling or game of chance shall be permitted within the limits of the park; nor shall any person use profane or obscene lan-

guage, commit or maintain a nuisance, or be guilty of disorderly conduct or any act involving immorality therein.

14. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who violate any of the foregoing rules, will be summarily removed from the park and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

No lessee or licensee shall retain in his employ any person whose presence in the park shall be deemed and declared by the superintendent to be subversive of the good order and management of the reservation.

15. Any person who violates any of the foregoing regulations will be deemed guilty of a misdemeanor, and be subjected to a fine, as provided by the act of April 21, 1904, of not less than \$5 nor more than \$100 and may be imprisoned for a term of not more than six months for each offense.

WIND CAVE NATIONAL PARK.

The act of Congress approved January 9, 1903 (32 Stat., 765), reserved a tract of land containing 10,522 acres in the State of South Dakota, 12 miles east of the town of Hot Springs and about the same distance southeast of Custer, as a public park, to be known as the Wind Cave National Park.

With the consent of the Attorney General, Mr. Seth Bullock, marshal for the district of South Dakota, has been continued in general charge of the reservation in an advisory capacity, and the superintendent confers with him in regard to the administration thereof. The course pursued has aided in the effective management of the park during the park season. The present superintendent, A. C. Boland, was appointed May 1, 1911, succeeding R. J. Pilcher, who resigned on that date.

At the time of the creation of the park there were 10 entries covering lands within the park, aggregating 1,519.15 acres. Since that date the Government has secured title to all of the lands within the park except the NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ and NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 35, T. 5 S., R. 5 E., Black Hills meridian. Jonathan C. West patented December 31, 1904, 80 acres, which is now owned by W. A. Rankin, formerly a superintendent of the park. For administrative reasons it is desirable that this private holding be eliminated from the park, and it is recommended that adequate appropriation be made by Congress for the purpose.

During the past year 3,199 tourists entered the park, of whom 2,410 came in licensed vehicles and the remainder in private conveyances. There were 86 campers in the reservation during the season. No stock was driven through the park.

Eight permits were granted for transportation of passengers through the park, at the rate of \$50 per vehicle, seven of which were for use of automobiles and one by wagon. The roads in the park are in good condition, but there is need of constant repair work, especially after rains. Three new bridges were built during the year; the Wind Cave Hill was graded and made wide enough to permit two hacks or automobiles to pass at any point; ditches were dug on both



sides of the road to carry away water; and culverts were put in where needed. The driveway at the superintendent's house was also widened. Gravel and stones on the north side of the house were removed and grass seed sown. Several trees were also planted. The water tank was repaired and a fence built around it.

One fire occurred in the park, but it was extinguished before much damage was done.

Within the cave considerable repair work has been done on bridges, stairs, and paths. Two new bridges were built and eight new stairways.

A national game preserve has been established in the Wind Cave National Park under the provisions of "An act making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and thirteen," approved August 10, 1912 (37 Stat., 293), as follows:

For the establishment of a national game preserve, to be known as the Wind Cave National Game Preserve, upon the land embraced within the boundaries of the Wind Cave National Park, in the State of South Dakota, for a permanent national range for a herd of buffalo to be presented to the United States by the American Bison Society, and for such other native American game animals as may be placed therein. The Secretary of Agriculture is authorized to acquire by purchase or condemnation such adjacent lands as may be necessary for the purpose of assuring an adequate, permanent water supply and to inclose the said game preserve with a good and substantial fence and to erect thereon all necessary sheds and buildings for the proper care and maintenance of the said animals, twenty-six thousand dollars, to be available until expended.

It is understood that steps are now being taken by the Secretary of Agriculture to acquire the necessary lands.

GENERAL REGULATIONS OF MARCH 30, 1912.

Pursuant to authority conferred by the act of Congress approved January 9, 1903, the following rules and regulations for the government of the Wind Cave National Park, in South Dakota, are hereby established and made public:

1. It is forbidden to remove or injure the specimens or formations in and around the Wind Cave, or to deface the same by written inscription or otherwise, or to injure or disturb in any manner or carry off any of the mineral deposits, specimens, natural curiosities, or wonders on the Government lands within the park.

2. No person shall be permitted to enter the cave unless accompanied by the superintendent or other park employee, or by competent guides.

3. It is forbidden to cut or injure any timber growing on the park lands, or to deface or injure any Government property. Camping parties will be allowed to use dead or fallen timber for fuel.

4. Fires should be lighted only when necessary and completely extinguished when no longer required. The utmost care must be exercised at all times to avoid setting fire to the timber and grass.

5. Hunting or killing, wounding or capturing any bird or wild animal on the park lands, except dangerous animals when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in pos-

session of game killed on the park lands under other circumstances than prescribed above, will be taken up by the superintendent and held subject to the order of the Secretary of the Interior, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof.

6. Fishing in any other way than with hook and line is forbidden, and may be prohibited by order of the superintendent in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior. Fishing for purposes of merchandise or profit is forbidden. All fish less than 8 inches in length should at once be returned to the water with the least damage possible to the fish. Fish that are to be retained must be at once killed by a blow on the back of the head or by thrusting a knife or other sharp instrument into the head.

7. No person will be permitted to reside permanently, engage in any business, or erect buildings, etc., upon the Government lands in the park, without permission, in writing, from the Secretary of the Interior. The superintendent may grant authority to competent persons to act as guides and revoke the same in his discretion. No pack trains will be allowed in the park unless in charge of a duly registered guide.

8. Owners of patented lands within the park limits are entitled to the full use and enjoyment thereof; the boundaries of such lands, however, must be determined, and marked and defined, so that they may be readily distinguished from the park lands. While no limitations or conditions are imposed upon the use of such private lands so long as such use does not interfere with or injure the park, private owners must provide against trespass by their stock or cattle, or otherwise, upon the park lands, and all trespasses committed will be punished to the full extent of the law. Stock may be taken over the park lands to patented private lands with the written permission and under the supervision of the superintendent, but such permission and supervision are not required when access to such private lands is had wholly over roads or lands not owned or controlled by the United States.

9. Allowing the running at large, herding, or grazing of cattle or stock of any kind on the Government lands in the park, as well as the driving of such stock or cattle over same, is strictly forbidden, except where authority therefor has been granted by the superintendent. All cattle or stock found trespassing on the park lands will be impounded and disposed of as directed in regulations approved March 30, 1912.

10. No drinking saloon or barroom will be permitted upon Government lands in the park.

11. Private notices or advertisements shall not be posted or displayed on the Government lands within the reservation, except such as may be necessary for the convenience and guidance of the public.

12. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who violate any of the foregoing rules, will be summarily removed from the park and will not be allowed to re-

turn without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

No lessee or licensee shall retain in his employ any person whose presence in the park shall be deemed and declared by the superintendent to be subversive of the good order and management of the reservation.

13. Any person who violates any of the foregoing regulations will be deemed guilty of a misdemeanor and, upon conviction, be fined not more than \$1,000, or be imprisoned not more than 12 months, or both, in the discretion of the court, as provided by the act creating the park.

14. The superintendent designated by the Secretary is hereby authorized and directed to remove all trespassers from the Government lands in the park and enforce these rules and regulations and all the provisions of the act of Congress aforesaid.

REGULATIONS OF MARCH 30, 1912, GOVERNING THE IMPOUNDING AND DISPOSITION OF LOOSE LIVE STOCK.

Horses, cattle, or other domestic live stock running at large or being herded or grazed on Government lands in the Wind Cave National Park without authority therefor, will be taken up and impounded by the superintendent, who will at once give notice thereof to the owner, if known. If the owner is not known, notice of such impounding, giving a description of the animal or animals, with the brands thereon, will be posted in six public places inside the park and in two public places outside the park. Any owner of an animal thus impounded may, at any time before the sale thereof, reclaim the same upon proving ownership and paying the cost of notice and all expenses incident to the taking up and detention of such animal, including the cost of feeding and caring for the same. If any animal thus impounded shall not be reclaimed within 30 days from notice to the owner or from the date of posting notices, it shall be sold at public auction at such time and place as may be fixed by the superintendent after 10 days' notice, to be given by posting notices in six public places in the park and two public places outside the park, and by mailing to the owner, if known, a copy thereof.

All money received from the sale of such animals and remaining after the payment of all expenses incident to the taking up, impounding, and selling thereof, shall be carefully retained by the superintendent in a separate fund for a period of six months, during which time the net proceeds from the sale of any animal may be claimed by and paid to the owner upon the presentation of satisfactory proof of ownership, and if not so claimed within six months from the date of sale such proceeds shall be turned into the Wind Cave National Park fund.

The superintendent shall keep a record in which shall be set down a description of all animals impounded, giving the brands found on them, the date and locality of the taking up, the date of all notices and manner in which they were given, the date of sale, the name and address of the purchaser, the amount for which each animal was sold and the cost incurred in connection therewith, and the disposition of the proceeds.

The superintendent will, in each instance, make every reasonable effort to ascertain the owner of animals impounded and to give actual notice thereof to such owner.

SULLYS HILL PARK.

This reservation, set aside by Executive proclamation dated June 2, 1904, under the act approved April 27, 1904 (33 Stat., 319), con-

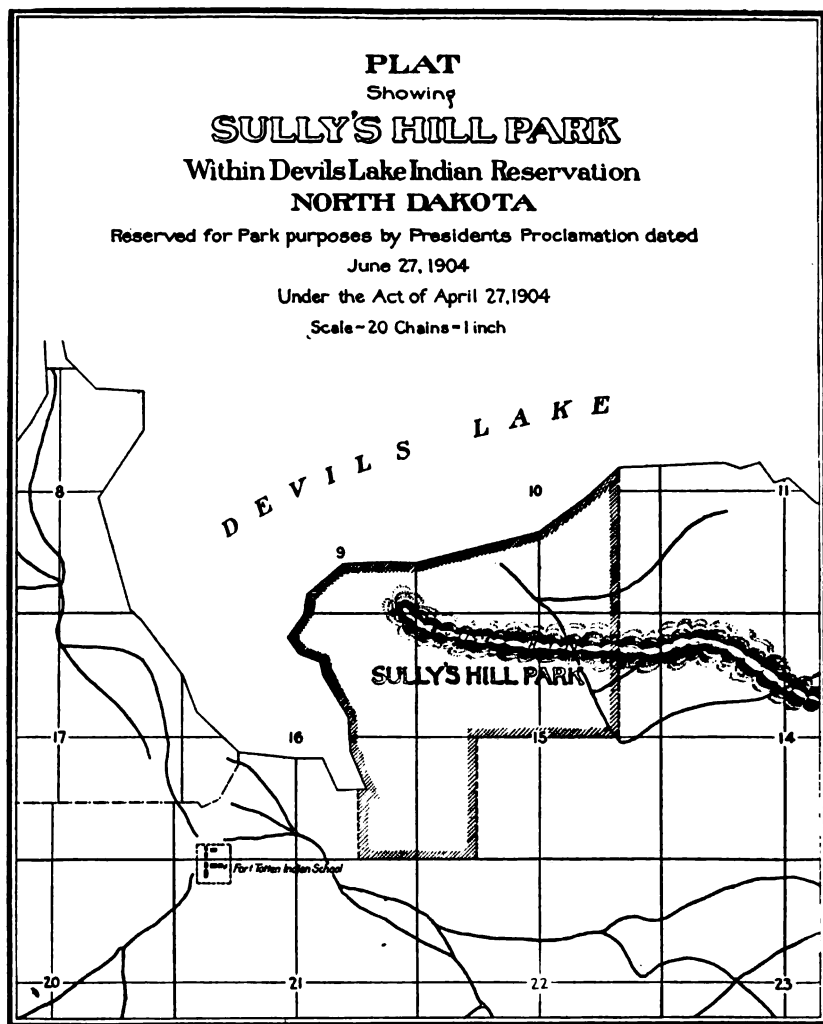


FIG. 1.—Map of Sullys Hill Park.

tains about 780 acres. It is located on the south shore of Devils Lake, N. Dak., having about 2 miles of shore line, with its western boundary 1 mile east of the Fort Totten Indian School. Inasmuch as no appropriation has been made for the care and protection of this

reservation, Mr. Charles M. Ziebach, in charge of the Indian industrial school (Fort Totten), has been continued as acting superintendent, and required to exercise the necessary supervision and control over the same until appropriation is made therefor by Congress.

The tract is well wooded and has an ample supply of water and many rugged hills, among which, on the western boundary, lies what is known as Sullys Hill. In the southwestern part is a small body of water known as Sweet Water Lake, west of which the surface is generally level and the soil good. The acting superintendent in his report for 1911 states:

The park is practically in the same condition as when I assumed charge of same in 1906, excepting that the continuous rains during the past season have placed the roads in nearly an impassable condition. On account of the road conditions very few persons visited the park during the past season and not to exceed 25 camped within the park boundaries for three days or more. A large number of people from Devils Lake and the surrounding country visited the park for a few hours, landing on Sullys Beach in rowboats, the trips being made by launch from the Chautauqua grounds. No stock was transported through the reservation. As no appropriation has ever been made for this park, no buildings constructed or improvements made of any kind, the park is looked upon as merely a deserted bit of wilderness and no interest will be taken until an appropriation is available and improvements made and roads built to enable the public to visit the park. Sullys Hill Park can not even boast of having an American flag within its borders, and this fact alone has a tendency to show a lack of interest by residents of the State at large.

If this park is to be continued under the supervision of the Secretary of the Interior, it is desirable that funds be provided for its protection and improvement, and an estimate in the sum of \$2,500 has accordingly been submitted to Congress for such purpose.

CASA GRANDE RUIN.

This reservation is located near Florence, Ariz., about 18 miles northeast of Casa Grande station, on the Southern Pacific Railroad, and contains about 480 acres. It was set aside by Executive order dated June 22, 1892, under the act approved March 2, 1889 (25 Stat., 961). By presidential proclamation of December 10, 1909, the boundaries of the reservation were changed by the elimination of 120 acres on which there were no prehistoric ruins and the inclusion of a tract of 120 acres adjoining the reservation on the east, on which are located important mounds of historic and scientific interest.

Casa Grande is an Indian ruin of undetermined antiquity, which was discovered in 1694 by Padre Kino, a Jesuit missionary. This great house is said to be the most important ruin of its type in the Southwest, and as such it has strong claims for archaeological study, repair, and permanent preservation. It is built of puddled clay molded into walls and dried in the sun, and is of perishable character. The main building was originally five or six stories high and covered a space 59 feet by 43 feet 3 inches. The walls have been gradually disintegrating, owing to the action of the elements. A corrugated iron roof has heretofore been erected over this building to protect it, so far as practicable, from further decay.

Surrounding Casa Grande proper is a rectangular walled inclosure or "compound," having an area of about 2 acres. In this inclosure, which has been called Compound A, excavations conducted under the Bureau of American Ethnology have resulted in the uncovering of a number of buildings or clusters of rooms, and others are known

to exist, but have not been excavated. Two other compounds were discovered and designated, respectively, Compound B and Compound C, but the latter has not been excavated, and is still in the form of a mound. These three compounds together constitute what is known as the Casa Grande group of ruins. As a result of this work, conducted under the Bureau of American Ethnology, the points of interest to visitors have been materially augmented. The ground plan of the ruin was increased by some 58 rooms, a number of plazas and surrounding walls, making the total number of rooms now open on the ground floor 100.

Reservation boundary

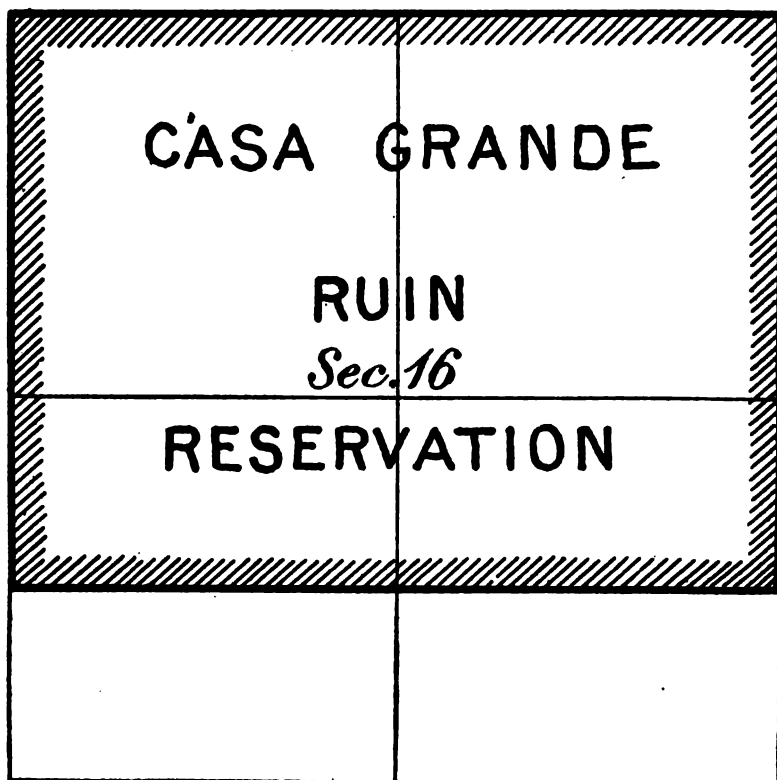


FIG. 2.—Casa Grande Ruin Reservation, Ariz., embracing the NW. $\frac{1}{4}$, the NE. $\frac{1}{4}$, the N. $\frac{1}{4}$ of the SW. $\frac{1}{4}$, and the N. $\frac{1}{4}$ of the SE. $\frac{1}{4}$ of sec. 16, T. 5 S., R. 8 E., Gila and Salt River meridian; set aside by executive order of June 22, 1892, under act of March 2, 1889.

Mr. Frank Pinkley, the custodian, who resides on the reservation, reports that the number of visitors during the year was fully up to the average and the usual interest seems to be shown by persons from the various parts of the United States in the ruin. He calls attention to the need of literature in relation to the ruin for distribution among visitors as a means of greatly increasing the interest of the public in the reservation, and recommends that provision be made for painting the roof and supports which protect the ruin, for

repairing the well, and for the supplying of suitable mechanical means for lifting water therefrom for the convenience of visitors, estimating the cost of these improvements at \$300.

NATIONAL MONUMENTS AND PRESERVATION OF AMERICAN ANTIQUITIES.

GENERAL STATEMENT.

By an act approved June 8, 1906, entitled "An act for the preservation of American antiquities," the President of the United States is authorized, "in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments." Under such authority the President has created the following monuments:

National monuments administered by Interior Department.

Name.	State.	Date.	Area.
			<i>Acres.</i>
Devils Tower.....	Wyoming.....	Sept. 24, 1906	1,152
Montezuma Castle.....	Arizona.....	Dec. 8, 1906	160
El Morro.....	New Mexico.....	do.....	160
Chaco Canyon.....	do.....	Mar. 11, 1907	120,629
Muir Woods ¹	California.....	Jan. 9, 1908	296
Pinnacles.....	do.....	Jan. 16, 1908	2,080
Tumacacori.....	Arizona.....	Sept. 15, 1908	10
Mukuntuweap.....	Utah.....	July 31, 1909	115,840
Shoshone Cavern.....	Wyoming.....	Sept. 21, 1909	210
Natural bridges ²	Utah.....	Sept. 25, 1909	12,740
Gran Quivira.....	New Mexico.....	Nov. 1, 1909	160
Sitka.....	A.aska.....	Mar. 23, 1910	157
Rainbow Bridge ³	Utah.....	May 30, 1910	160
Lewis and Clark Cavern.....	Montana.....	May 16, 1911	160
Colorado.....	Colorado.....	May 24, 1911	13,883
Petrified forest.....	Arizona.....	July 31, 1911	25,625
Navajo ⁴	do.....	Mar. 14, 1912	1360

¹ Estimated area.

² Donated to the United States.

³ Originally set aside by proclamation of Apr. 16, 1908, and contained only 120 acres.

⁴ Within an Indian reservation.

⁵ Based on 15 known ruins with a reserved area of 40 acres surrounding each ruin. Exterior limits of tract specified in proclamation contain 918,310 acres.

The following regulations for the protection of national monuments were promulgated on November 19, 1910:

1. Fires are absolutely prohibited.
2. No firearms are allowed.
3. No fishing permitted.
4. Flowers, ferns, or shrubs must not be picked, nor may any damage be done to the trees.
5. Vehicles and horses may be left only at the places designated for this purpose.
6. Lunches may be eaten only at the spots marked out for such use, and all refuse and litter must be placed in the receptacles provided.
7. Pollution of the water in any manner is prohibited; it must be kept clean enough for drinking purposes.
8. No drinking saloon or barroom will be permitted.

9. Persons rendering themselves obnoxious by disorderly conduct or bad behavior, or who may violate any of the foregoing rules, will be summarily removed.

Names and addresses of officers having supervision of national monuments.

- F. C. Dezendorf, new customhouse building, San Francisco, Cal.:
 Muir Woods National Monument, Cal.
 Pinnacles National Monument, Cal.
- Gratz W. Helm, Federal building, Los Angeles, Cal.:
 Montezuma Castle National Monument, Ariz.
 Petrified Forest National Monument, Ariz.
 Tumacacori National Monument, Ariz.
 Navajo National Monument, Ariz.
- George E. Hair, Federal building, Salt Lake City, Utah:
 Mukuntuweap National Monument, Utah.
 Natural Bridges National Monument, Utah.
 Rainbow Bridge National Monument, Utah.
- Leroy O. Moore, Santa Fe, N. Mex.:
 El Morro National Monument, N. Mex.
 Chaco Canyon National Monument, N. Mex.
 Gran Quivira National Monument, N. Mex.
- Ira Lantz, Helena, Mont., Lewis and Clark Cavern National Monument, Mont.
- Adelbert Baker, Cheyenne, Wyo.:
 Devils Tower National Monument, Wyo.
 Shoshone Cavern National Monument, Wyo.
- A. Christensen, special agent in charge field service, Alaska (219 Federal building, Seattle, Wash.), Sitka National Monument, Alaska.

The Navajo National Monument as originally created by proclamation of March 20, 1909, embraced approximately 600 acres within the Navajo Indian Reservation, which was reserved tentatively and with a view to reduction to such small tract or tracts as might thereafter be found to contain valuable prehistoric pueblo or cliff dwellings, when the extent of the same could be determined by an examination on the ground and their locus definitely fixed by traverse lines connecting them with some corner of the public survey. Both of these conditions having been fulfilled, the monument was reduced by proclamation dated March 14, 1912, to three small tracts aggregating 360 acres. Within two of these tracts are located, respectively, two interesting and extensive pueblo or cliff-dwelling ruins in a good state of preservation and known as "Betata Kin" and "Keet Seel," and a third cliff-dwelling ruin called "Inscription House," located on Navajo Creek. "Inscription House" is regarded as extraordinary, not only because of its good state of preservation but because of the fact that upon the walls of its rooms were found inscriptions written in Spanish by early explorers and plainly dated 1661.

The Mount Olympus (Wash.) National Monument was set aside by proclamation dated March 2, 1909, and contains approximately 608,640 acres. It was reduced by proclamation dated April 17, 1912, to 608,480 acres, in order to permit certain claimants to land therein to secure title to the land.

The supervision of these various monuments has, in the absence of any specific appropriation for their protection and improvement, necessarily been intrusted to the field officers of the department having charge of the territory in which the several monuments are located. This supervision in many instances is necessarily limited, and considerable difficulty has been experienced in protecting the monuments from vandalism, unauthorized exploration, and spolia-

tion. An estimate for an appropriation of \$5,000 has been submitted to Congress for the protection and improvement of these reservations. Only such monuments as in the judgment of the Secretary of the Interior are subject to depredations by vandals and unauthorized collectors should be provided with a custodian or superintendent and then only when such danger really exists. In this way a small general appropriation can be made available and adequate for the whole field.

National monuments administered by the Department of Agriculture.

Name.	State.	Date.	Area.
Cinder Cone.....	California.....	May 6, 1907	<i>Acres.</i> 15,120
Lassen Peak.....	do.....	do.....	11,280
Gila Cliff dwellings.....	New Mexico.....	Nov. 16, 1907	160
Tonto.....	Arizona.....	Dec. 19, 1907	1,640
Grand Canyon.....	do.....	Jan. 11, 1908	1,806,400
Jewel Cave.....	South Dakota.....	Feb. 7, 1908	11,280
Wheeler.....	Colorado.....	Dec. 7, 1908	300
Oregon Caves.....	Oregon.....	July 12, 1909	480
Devil's Postpile.....	California.....	July 6, 1911	800
Mount Olympus.....	Washington.....	Apr. 17, 1912	1,608,480

¹ Estimated area.

National monument administered by the War Department.

Name.	State.	Date.	Area.
Big Hole Battle Field.....	Montana.....	June 23, 1910 ¹	<i>Acres.</i> 5

¹ Set aside by Executive order.

The uniform rules and regulations promulgated by the Secretaries of the Interior, Agriculture, and War, under date of December 28, 1906, to carry into effect the general provisions of the act for the preservation of American antiquities provides (par. 3) that—

Permits for the excavations of ruins, the excavation of archeological sites, and the gathering of objects of antiquity will be granted, by the respective Secretaries having jurisdiction, to reputable museums, universities, colleges, or other recognized scientific or educational institutions, or to their duly authorized agents.

On June 26, 1912, a permit was granted by the department to Prof. Byron Cummings, of the University of Utah, to make examinations and excavations within the Navajo National Monument, and in the Navajo and Pahute Indian Reservations, as well as on lands 30 miles northwest of Bluff, Utah. A number of the largest archeological institutions in the country have claimed that the uniform regulations of December 28, 1906, should be amended so as to remove certain restrictions which they regard as oppressive. This matter is still under consideration in the department.

MUIR WOODS NATIONAL MONUMENT.

On December 31, 1907, the Secretary of the Interior, for and on behalf of the United States, accepted from William Kent and his

wife, Elizabeth Thatcher Kent, of Chicago, Ill., in accordance with the act of Congress approved June 8, 1906, entitled "An act for the preservation of American antiquities," a deed conveying to the United States the following-described land, situate in Marin County, Cal.:

Beginning at a stake, A. 7, driven in the center of the road in Redwood Cañon and located by the following courses and distances from the point of commencement of the tract of land, which was conveyed by the Tamalpais Land and Water Company to William Kent by a deed dated August 29th, 1905, and recorded in the office of the county recorder of Marin County, California, Book 95 of Deeds at page 58, to wit: North eighteen degrees thirty-two minutes, east two hundred thirty-two and sixty-four hundredths feet, north sixty-six degrees thirty minutes, west one hundred sixty-seven and thirty-four hundredths feet, north eighty-six degrees twenty-five minutes, west ninety-eight and sixty-two hundredths feet, north seventy degrees no minutes, west two hundred

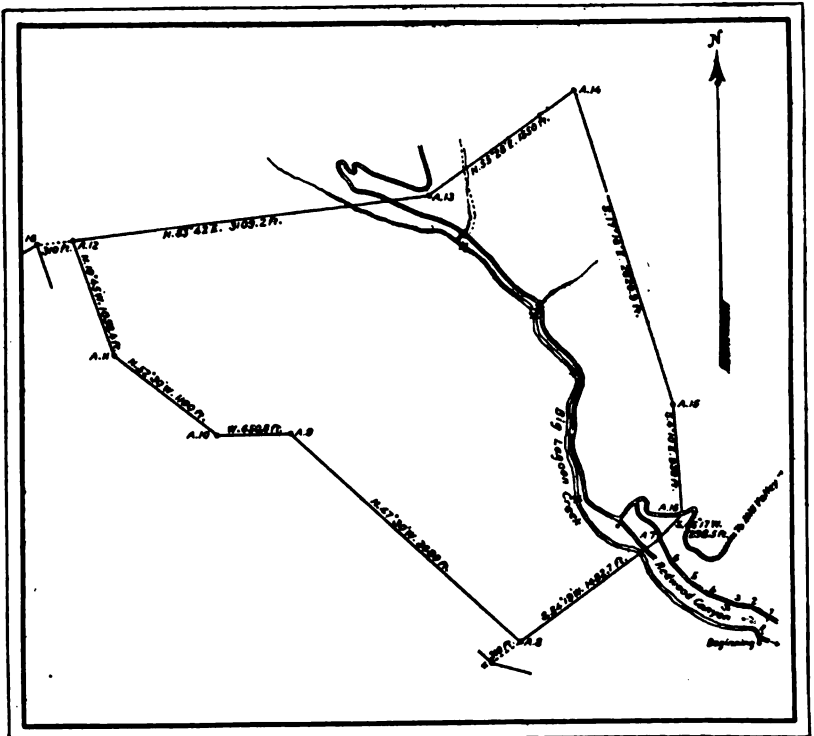


FIG. 3.—Muir Woods National Monument, Cal., in T. 1 N., R. 6 W., Mount Diablo meridian; created January 9, 1908.

forty-one and seven hundredths feet, north fifty-seven degrees twenty-nine minutes, west one hundred seventy-eight and three-hundredths feet, north forty-six degrees twenty-two minutes, west two hundred thirty-five and thirty-nine hundredths feet, and north twenty-four degrees twenty-five minutes, west two hundred twenty-five and fifty-six hundredths feet; thence from said stake, A. 7, the point of beginning, south fifty-four degrees nineteen minutes, west fourteen hundred eighty-two and seven-tenths feet to Station A. 8, from which Station 4 of the survey of the tract of land conveyed to William Kent as aforesaid bears south fifty-four degrees nineteen minutes, west three hundred ten feet distant; thence from said Station A. 8 north forty-seven degrees thirty minutes, west twenty-six hundred eighty feet; thence due west six hundred fifty and eight-tenths feet; thence north fifty-two degrees thirty minutes, west eleven hundred feet; thence north nineteen degrees forty-five minutes, west

ten hundred fifty-eight and four-tenths feet to Station A. 12, from which Station 16 of the survey of the tract of land conveyed to William Kent as aforesaid bears south eighty-three degrees forty-two minutes, west three hundred ten feet distant; thence north eighty-three degrees forty-two minutes, east thirty-one hundred nine and two-tenths feet; thence north fifty-five degrees twenty-eight minutes, east fifteen hundred fifty feet to an iron bolt, three-quarters of an inch in diameter and thirty inches long, Station 14; thence south seventeen degrees eighteen minutes, east twenty-eight hundred twenty and nine-tenths feet; thence south four degrees ten minutes, east nine hundred thirty feet to a stake, A. 16, driven in the center of a graded road; and thence south forty-five degrees seventeen minutes, west two hundred ninety-eight and five-tenths feet to said stake A. 7, the place of beginning. Containing an area of two hundred ninety-five acres, a little more or less.

On January 9, 1908, the President, by virtue of the power and authority vested in him by section 2 of said act, declared, proclaimed, and set apart the lands described as a "national monument to be known and recognized as Muir Woods National Monument." The Secretary of the Interior had, prior to the date last mentioned, withdrawn the lands from entry or sale.

On September 10, 1908, the department prescribed regulations as follows for the government and protection of said monument:

The following rules and regulations for the government of the Muir Woods National Monument, in the State of California, set aside under the provisions of the act of Congress approved June 8, 1906, are hereby established and made public, pursuant to the authority conferred by said act:

1. Fires are absolutely prohibited.
2. No firearms allowed.
3. No fishing permitted.
4. Flowers, ferns, or shrubs must not be picked, nor may any damage be done to the trees.
5. Vehicles and horses may be left only at the places designated for this purpose.
6. Lunches may be eaten only at the spots marked out for such use, and all refuse and litter must be placed in the receptacles provided.
7. Pollution of the water in any manner is prohibited. It must be kept clean enough for drinking purposes.
8. No drinking saloon or barroom will be permitted.
9. Persons rendering themselves obnoxious by disorderly conduct or bad behavior, or who may violate any of the foregoing rules, will be summarily removed.

While the sundry civil act approved May 27, 1908 (35 Stat., 317), was pending before Congress attention was called to the fact that no provision was made for the salaries of custodians or for other protection of national monuments, as recommended in the estimates for these services, and that the department would be embarrassed in its efforts to protect monuments from vandalism and unauthorized exploration and spoliation because of a lack of funds. The department had recommended an appropriation of \$5,000 for these purposes. Three thousand dollars had been appropriated the previous year, but because of defective wording of the act was not made available. However, on July 11, 1910, Andrew Lind, of California, was appointed custodian of the Muir Woods National Monument, at a salary of \$900 per annum, payable from the appropriation "Protection of public lands and timber."

These lands consist of one of the most noted redwood groves in the State of California, and were held in private ownership by Mr. Kent. The tract is of great scientific interest, contains many redwood trees which have grown to a height of 300 feet and have a diameter at the butt of 18 feet or more. It is located in a direct line about 7 miles

from San Francisco, Cal., and is in close proximity to a large and growing suburban population.

The report of Mr. Andrew Lind, the custodian of the reservation, for the year shows that the monument was carefully patrolled and the regulations for the government thereof enforced. Obstructions to the roads and trails in the shape of fallen trees have been removed, and the roads have been placed in condition for the accommodation of travel. About 40,000 people visited the monument during the year. Mr. Lind recommends that allotments be made for the renewing and cleaning out of the fire lines, that the main road running through the reservation be put in better condition, and that a suitable building be provided inside the monument for the use of the custodian.

During the year the sum of \$1,534.55 was expended in protection and improvement of the monument, and the custodian requests that \$2,600 be allotted for the protection and management of the monument during the next fiscal year.

PETRIFIED FOREST OF ARIZONA.

The Petrified Forest of Arizona lies in the area between the Little Colorado River and the Rio Puerco, 15 miles east of their junction and 6 miles south of Adamana, a station on the Santa Fe Pacific Railroad, from which place it is accessible by horse or vehicle. This area is of great interest because of the abundance of petrified coniferous trees, as well as its scenic features. The trees lie scattered about in great profusion; none, however, stands erect in its original place of growth, as do many of the petrified trees in the Yellowstone National Park. The trees probably at one time grew beside an inland sea; after falling they became waterlogged, and during decomposition the cell structure of the wood was entirely replaced by silica derived from sandstone in the surrounding land. Over a greater part of the entire area trees lie scattered in all conceivable positions and in fragments of all sizes. Perhaps the most prominent of all the scenic features of the region is the well-known Natural Bridge, consisting of a great petrified trunk lying across a canyon 45 feet in width and forming a footbridge over which anyone may easily pass.

Prof. Lester F. Ward, of the Geological Survey, has stated that "There is no other petrified forest in which the wood assumes so many varied and interesting forms and colors, and it is these that present the chief attraction for the general public. The state of mineralization in which much of this wood exists almost places them among the gems or precious stones. Not only are chalcedony, opals, and agates found among them, but many approach the condition of jasper and onyx. The degree of hardness attained by them is such that they are said to make an excellent quality of emery."

Dr. Walter Hough, of the Smithsonian Institution, who visited this monument, states that "In the celebrated Petrified Forest, which is some 18 miles from Holbrook, Ariz., on the picturesque Santa Fe Railroad, there are ruins of several ancient Indian villages. These villages are small, in some cases having merely a few houses, but what gives them a peculiar interest is that they were built of logs of beautiful fossil wood. * * * The prehistoric dwellers of the land selected cylinders of uniform size, which were seemingly deter-

mined by the carrying strength of a man. It is probable that prehistoric builders never chose more beautiful stones for the construction of their habitations than the trunks of the trees which flourished ages before man appeared on the earth.

"This wood agate also furnished material for stone hammers, arrowheads, and knives, which are often found in ruins hundreds of miles from the forest."

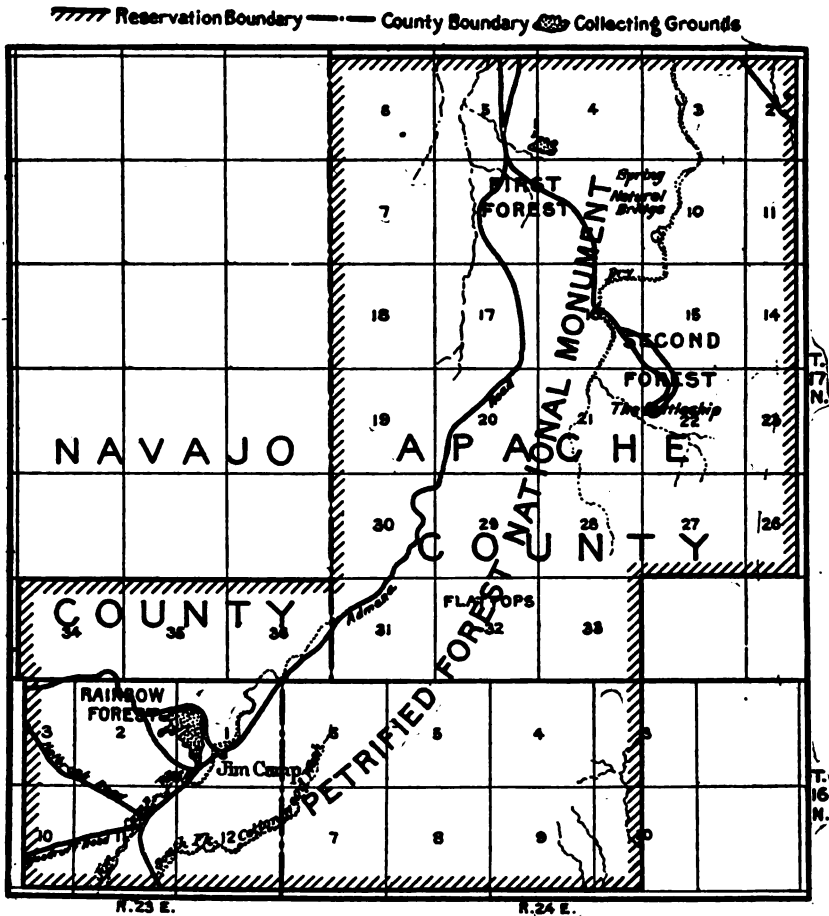


FIG. 4.—Petrified Forest National Monument, Ariz., embracing secs. 1, 2, 11, and 12 and E. $\frac{1}{2}$ secs. 3 and 10, T. 16 N., R. 23 E.; secs. 4 to 9 and W. $\frac{1}{2}$ secs. 3 and 10, T. 16 N., R. 24 E.; secs. 34, 35, 36, T. 17 N., R. 23 E.; secs. 3 to 10, 15 to 22, 27 to 33, and W. $\frac{1}{2}$ secs. 2, 11, 14, 23, 26, T. 17 N., R. 24 E., Gila and Salt River meridian, containing 40.04 square miles, set aside by proclamation of the President July 31, 1911.

NAVAJO NATIONAL MONUMENT.

This monument as originally created embraces a large area within the Navajo Indian Reservation, which was reserved tentatively and with a view to a reduction to such small tract or tracts as might be found to contain valuable prehistoric pueblo or cliff dwellings when

the extent of same could be determined by examination on the ground and their locus definitely fixed by traverse lines connecting them with some corner of the public surveys. Both of these conditions have now been fulfilled. By proclamation of March 14, 1912, the original reserve was reduced to three small tracts, embracing 360 acres, within which are located, respectively, two most interesting and extensive pueblo cliff-dwelling ruins in a remarkable state of preservation and known as the Betata Kin and Keet Seel, and a third cliff-dwelling

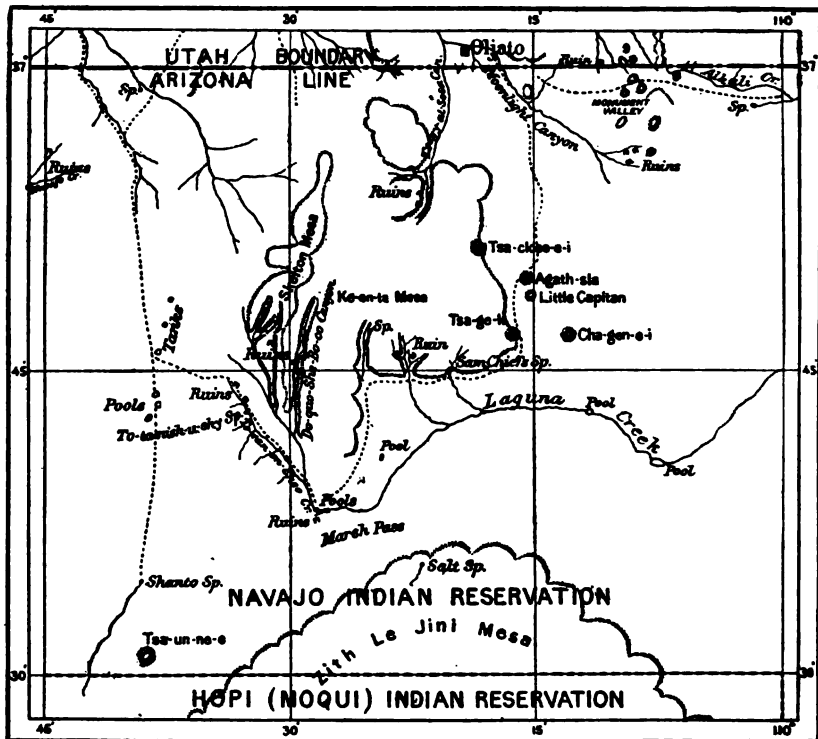


FIG. 5.—Navajo National Monument, Ariz., embracing all cliff-dwelling and pueblo ruins between the parallel of latitude $36^{\circ} 30'$ and 37° north and longitude 110° and $110^{\circ} 45'$ west from Greenwich, with 40 acres of land in square form around each of said ruins; created March 20, 1909.

ruin called Inscription House located on Navajo Creek just beyond the western boundary of the present monument and centrally located within and protected by a tract of land containing 40 acres. Inscription House is extraordinary not only because of its remarkable state of preservation, but because upon the walls of its well-preserved rooms were found inscriptions written in Spanish by early explorers and plainly dated 1661.

The new boundaries of the Navajo National Monument under the latter proclamation are shown in the preceding plat.

CHACO CANYON NATIONAL MONUMENT.

These remarkable relics of an unknown people embrace numerous communal or pueblo dwellings built of stone, among which is the ruin known as Pueblo Bonito, containing, as it originally stood, 1,200 rooms and being the largest prehistoric ruin yet discovered in the Southwest. Numerous other ruins, containing from fifty to a hundred or more rooms, are scattered along Chaco Canyon and tribu-

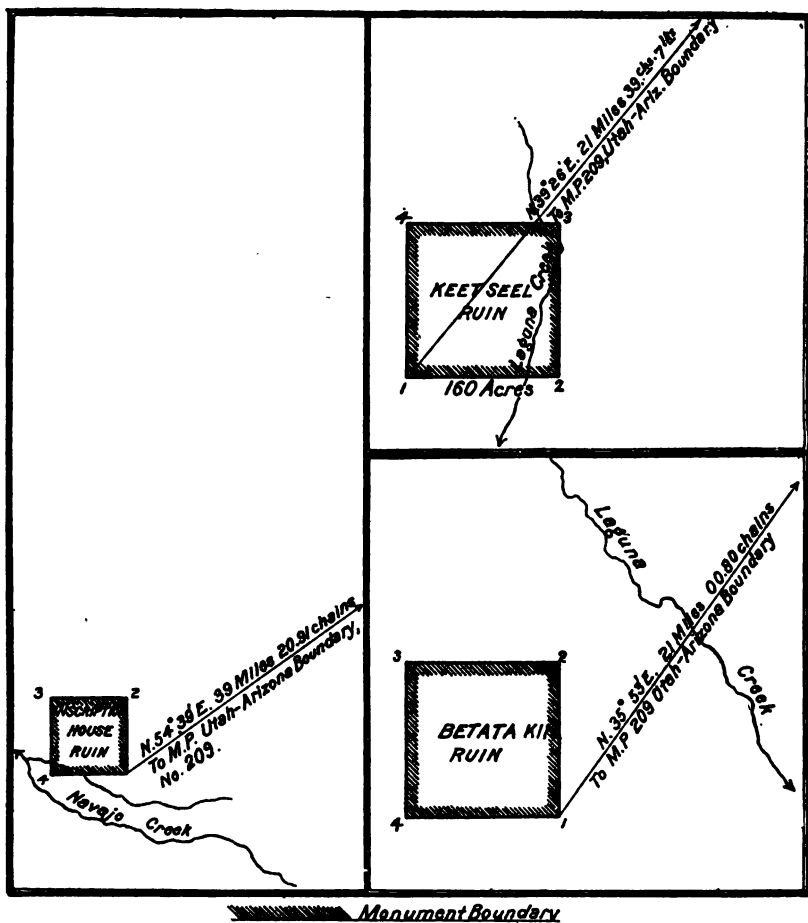
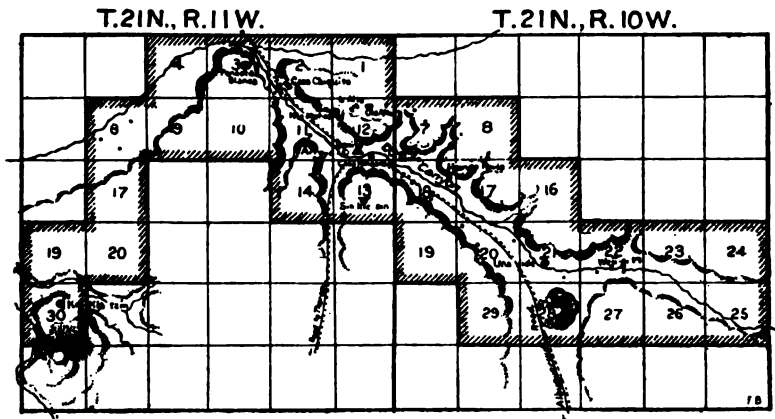
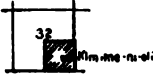


FIG. 6.—Navajo National Monument, Ariz., containing 360 acres, embracing the Keet Seel and Betata Kin ruins, located in two small tracts of 160 acres each, along Laguna Creek, and Inscription House ruins, on Navajo Creek, in a 40-acre tract, all within the Navajo Indian Reservation.

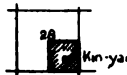
aries for a distance of about 14 miles and upon adjacent territory to the east, south, and west of Chaco Canyon many miles farther. The most important of these ruins are as follows: Pueblo Bonito, Chetro Kettle, Arroyo, New Alto, Old Alto, Kin-Klet Soi, Casa Chiquita, Penasco Blanco, Kin-Kla-tzin, Hungo Pavis, Unda Vidie, Weji-gi, Kim-me-ni-oli, Kin-yai, Casa Morena, and Pintado.



T.21N., R.12W.



T.17N., R.12W.



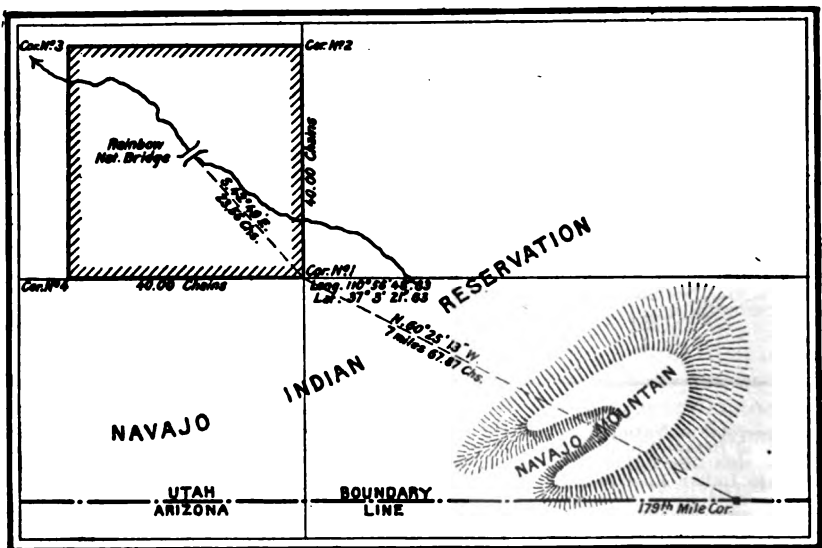
T.17N., R.10W.



T.20N., R.8W.



FIG. 7.—Chaco Canyon National Monument, N. Mex., embracing secs. 7 and 8 and 16 to 29, inclusive, T. 21 N., R. 10 W.; secs. 1, 2, 3, 4, and 8 to 14, inclusive, and 17, 18, 20, and 30, T. 21 N., R. 11 W.; S. $\frac{1}{2}$ sec. 12, T. 20 N., R. 8 W.; SE. $\frac{1}{4}$ sec. 32, T. 21 N., R. 12 W.; SE. $\frac{1}{4}$ sec. 28, T. 17 N., R. 12 W.; SE. $\frac{1}{4}$ sec. 17, T. 17 N., R. 10 W., New Mexico principal meridian; created March 11, 1907.



Monument Boundary

FIG. 8.—Rainbow Bridge National Monument, Utah, embracing 180 acres of land in square form, the southeast corner of which bears from one hundred and seventy-ninth mile corner on the Utah and Arizona boundary N. 60° 25' 13" W. 7 miles 67.87 chains distant; created September 25, 1909.

RAINBOW BRIDGE NATIONAL MONUMENT.

This natural bridge is located within the Navajo Indian Reservation, near the southern boundary of Utah, a few miles northwest from Navajo Mountain, a well-known peak and landmark, and spans a canyon and small stream which drains the northwestern slopes of this peak. Among the known extraordinary natural bridges of the world, this bridge is unique in that it is not only a symmetrical arch below but presents also a curved surface above, thus presenting, roughly, the character of the rainbow, for which it is named. Its height above the surface of the water is 309 feet and its span is 278 feet.

The existence of this natural wonder was first disclosed to William B. Douglass, an examiner of surveys of the General Land Office, on August 14, 1909, by a Piute Indian, called "Mike's-boy," later "Jim," who was employed in connection with the survey of the natural bridges in White Canyon, Utah.

EL MORRO NATIONAL MONUMENT.

A feature of great historic interest and importance is the so-called El Morro or Inscription Rock, some 35 miles almost due east of Zuni Pueblo in western central New Mexico.

It is not too much to say that no rock formation in the West or perhaps in the world is so well adapted to the purpose for which this table of stone was used—at least history does not record any collection of similar data. Here are records covering two centuries, some of which are the only extant memoranda of the early expeditions and explorations of what is now the southwestern part of the United States. On these smooth walls, usually under some projecting stratum, inscriptions were cut by the early conquerors and explorers, which have made this rock one among the most interesting objects on the continent.

Here, in this remote and uninhabited region, in the shadows of one of nature's most unique obelisks, wrapped in the profound silence of the desert, with no living thing to break the stillness, it is hard to realize that 300 years ago these same walls echoed the clank of steel harness and coats of mail; that with the implements of Spanish conquest the pathfinders in the New World were carving historical records upon the eternal rock.

Locally Inscription Rock and El Morro are known as separate and distinct monumental rocks. The latter, translated The Castle, is the rock standing out in bold relief to the east, while Inscription Rock is the name applied to the formation to the west, which is a part of the mesa. On the south side in the angle formed by the two, one extending east and the other south, is a great chamber or cavern, a natural amphitheater where secure refuge from storm or human foe could easily be secured. It is here, too, that the only spring within many miles wells up as if to make the natural fortification doubly secure. Upon these walls are many of the best preserved Spanish inscriptions, although there are quite a number 200 feet east, under the shadows of a stately pine tree and on the north side of El Morro. Most of them are as plain and apparently as legible as the day they were written;

especially is this true of the older ones, carved during the sixteenth and seventeenth centuries.

The existence of extensive, prehistoric ruins on the very summit of Inscription Rock is another feature of interest. On the top of the rock a deep cleft or canyon divides the western end of the formation. On each of these arms is the remnant of large communal houses or pueblos. Some of the walls are yet standing and the ground plans of the structures are well defined. That on the south arm, and almost overhanging the cavern and spring, is approximately 200 by 150 feet. Some of the buildings must have been more than one story in height.

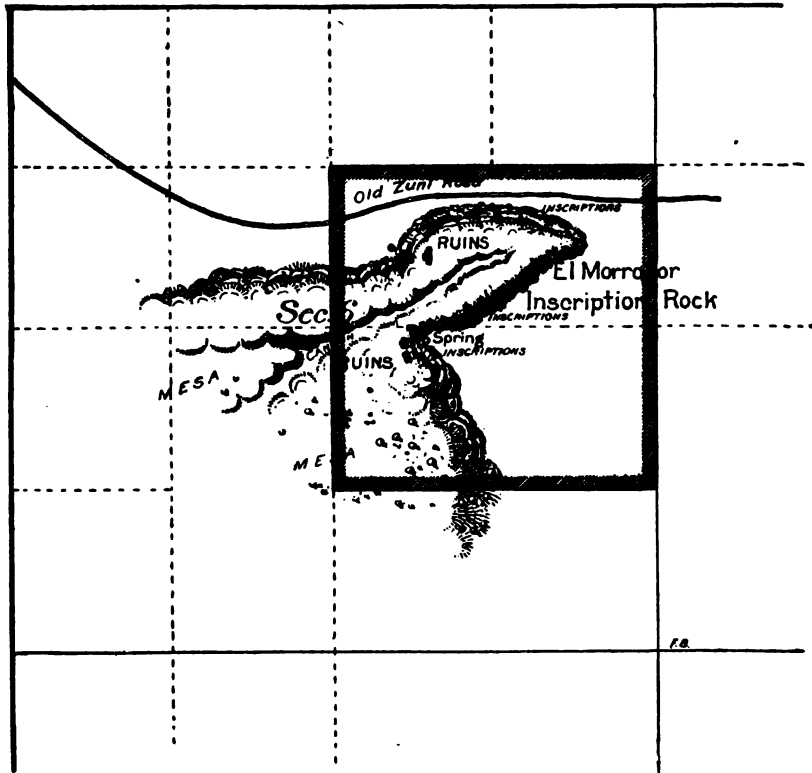


FIG. 9.—El Morro National Monument, N. Mex., embracing the S. $\frac{1}{4}$ NE. $\frac{1}{4}$ and N. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 6, T. 9 N., R. 14 W., New Mexico meridian; created December 8, 1906.

The remarkable natural defenses of the site and the existence of the spring doubtless induced the builders to select this odd location. At some distant day it may be desirable to excavate these ruins and thus add to this historic spot attractions for the scientist as well as the general public who are interested in scenic and natural curiosities.

LEWIS AND CLARK CAVERN NATIONAL MONUMENT.

The feature of this monument is a limestone cavern of great scientific interest, because of its length and because of the number of large vaulted chambers it contains. It is of historic interest, also,

because it overlooks for a distance of more than 50 miles the trail of Lewis and Clark along the Jefferson River, named by them. The vaults of the cavern are magnificently decorated with stalactites and stalagmite formations of great variety in size, form, and color, the equal of, if not rivaling, the similar formations in the well-known Luray caves in Virginia.

The cavern is located about 1 mile northeasterly from Limespur, a post office in Jefferson County, and a station on the Northern Pacific

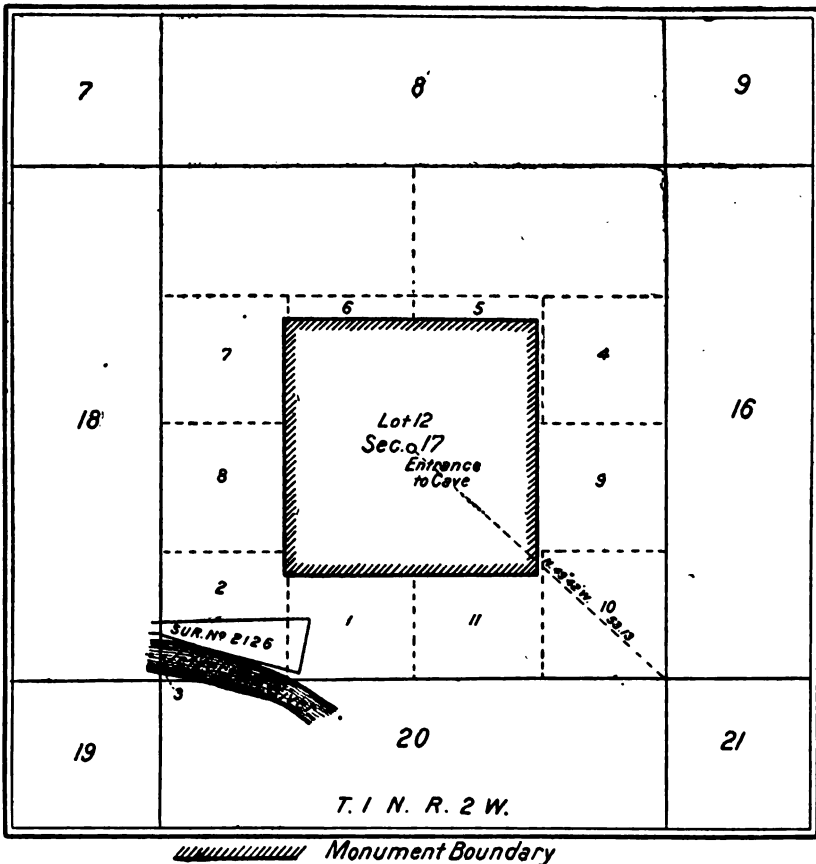


FIG. 10.—Lewis and Clark Cavern National Monument, Mont., embracing lot 12, sec. 17, T. 1 N., R. 2 W., Montana principal meridian; created May 11, 1908.

Railroad. Its two entrances, which are about 100 yards apart, are upon the walls of a deep canyon about 500 feet below the rim, and the cavern extends back therefrom approximately half a mile. The proclamation establishing this monument is as follows:

Whereas the unsurveyed tract of land containing an extraordinary limestone cavern and embracing one hundred and sixty acres, situated in township one north, range two west of the Montana principal meridian, Montana, and which was created the Lewis and Clark Cavern National Monument by proclamation dated the 11th day of May, 1908, has recently been definitely located by an official survey thereof, made under the direction of the Commissioner of the General Land Office, and such survey having determined that the tract in ques-

tion lies wholly within the limits of the grant of the Northern Pacific Railway Company but has not yet been patented to that company;

And whereas, by its quitclaim deed the said Northern Pacific Railway Company relinquished unto the United States all its right, title, and interest to lot twelve, section seventeen, township one north, range two west of the Montana principal meridian, Montana, the same being the original tract proclaimed a national monument, for the purpose of maintaining thereon the said Lewis and Clark Cavern National Monument, under the condition that the instrument of relinquishment shall become void and the premises immediately revert to the grantor should the monument no longer be maintained.

Now, therefore, I, William H. Taft, President of the United States of America, by virtue of the power in me vested by section two of the act of

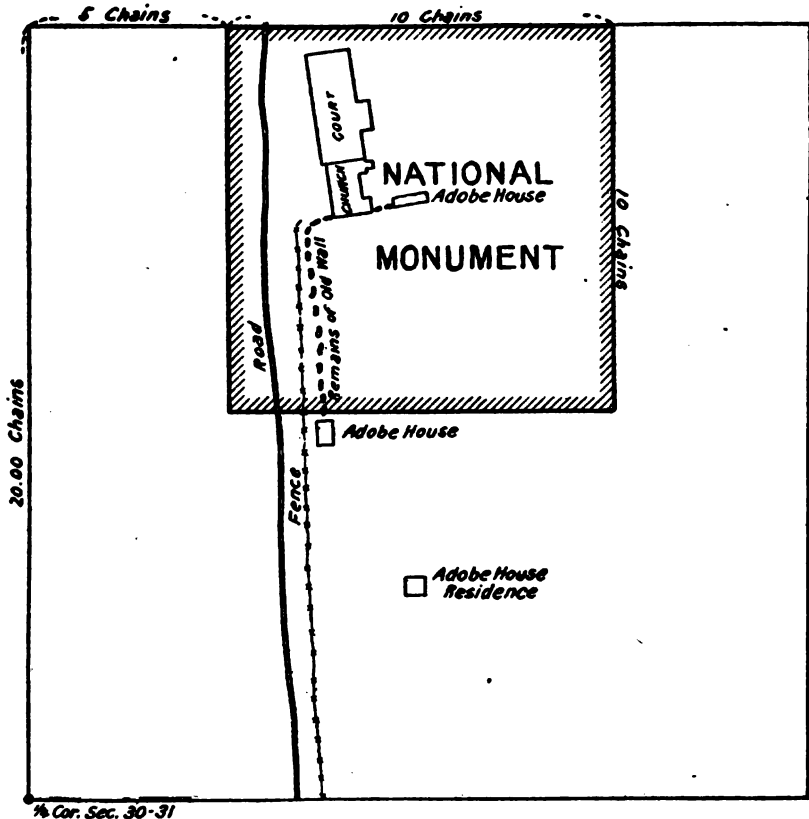


FIG. 11.—Tumacacori National Monument, Ariz., embracing the E. $\frac{1}{4}$ NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ and the W. $\frac{1}{4}$ NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ SE. $\frac{1}{4}$, sec. 30, T. 21 S., R. 13 E., Gila and Salt River meridian; created September 15, 1908.

Congress approved June 8, 1906, entitled "An act for the preservation of American antiquities," do hereby set aside and confirm as the Lewis and Clark Cavern National Monument the said tract, embracing one hundred and sixty acres of land, at and surrounding the limestone cavern in section seventeen, township one north, range two west, Montana, subject to the conditions set forth in the relinquishment and quitclaim deed No. 18129E, dated February 14, 1911, of the Northern Pacific Railway Company, the said tract being in square form and designated as lot twelve in the survey and deed, with side lines running north and south and all sides equidistant from the main entrance of the said cavern, the center of said entrance bearing north forty-nine degrees, forty-two minutes west, fifty-three and thirteen hundredths chains distant from the corner to sections sixteen, seventeen, twenty, and twenty-one, as shown upon diagram hereto attached and made a part hereof.

Warning is hereby expressly given to all persons not to appropriate, injure, or destroy any of the natural formations in the cavern hereby declared to be a national monument, nor to locate or settle upon any of the lands reserved and made a part of said monument by this proclamation.

In witness whereof, I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the city of Washington this sixteenth day of May, in the year of our Lord one thousand nine hundred and eleven, and of the independence of the United States the one hundred and thirty-fifth.

TUMACACORI NATIONAL MONUMENT.

This monument embraces 10 acres of land relinquished to the United States by a homestead entryman for the purposes specified in the act of June 8, 1906. Upon the tract is located a very ancient

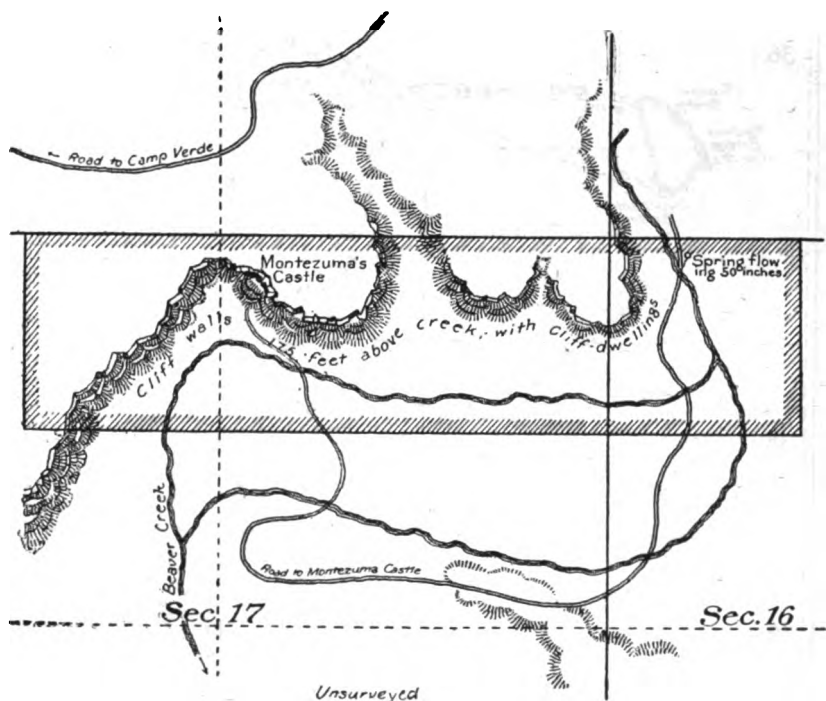


FIG. 12.—Montezuma Castle National Monument, Ariz., embracing the NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 13, the N. $\frac{1}{4}$ NE. $\frac{1}{4}$ and NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 17, T. 14 N., R. 5 E., Gila and Salt River meridian; created December 8, 1906.

Spanish mission ruin, erected probably, as appears from the reports, in the latter part of the sixteenth century. The church is in a remarkable state of preservation, owing to the fact that it was erected out of burned bricks and cement mortar.

MONTEZUMA CASTLE NATIONAL MONUMENT.

This structure is of very great interest, not only because of its picturesqueness, but for ethnological and other scientific reasons. It is strictly a cliff dwelling, with the added importance that it is also a communal house. Although very small as compared with the great

ruins of Chaco Canyon, Canyon de Chelley, Mesa Verde, the Mancos, and other localities of the Southwest, it is so unique in location and structural design, and so perfectly preserved, that it may be said to have no equal in the United States.

The character of the material used in the Verde cliff ruins, adobe, rubble, and a soft calcareous stone, rendered the progress of disintegration and ruin somewhat rapid, though many centuries must have elapsed since the passing of the race. The Mojave Apache Indians, who occupied the valley at the advent of the white men, have no tradition respecting the existence of the people who formerly

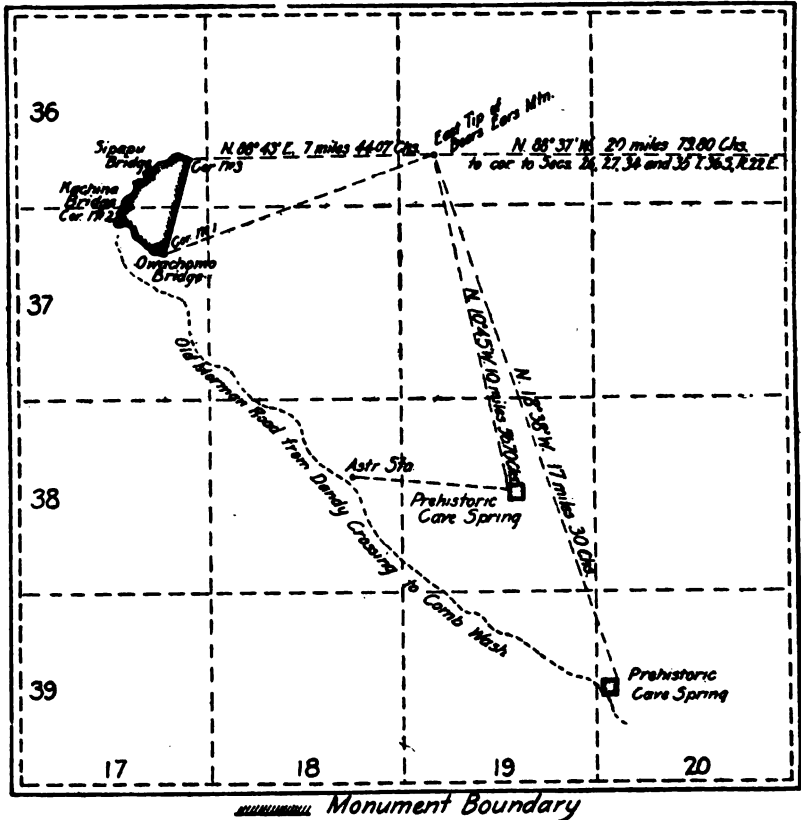


FIG. 13.—Natural Bridges National Monument, Utah, embracing a subtriangular tract in unsurveyed Tps. 36 and 37 S., R. 17 E., and two smaller tracts, one each in T. 38 S., R. 19 E., and T. 39 S., R. 20 E., Salt Lake meridian; created September 25, 1909.

occupied this region. Montezuma's Castle, it is stated, is the only single perfect specimen and type of the architectural skill of the prehistoric cliff dwellers of this valley.

NATURAL BRIDGES NATIONAL MONUMENT.

This tract of land was first created a national monument on April 16, 1908.

A second proclamation, issued by the President September 25, 1909, includes, besides the three bridges originally reserved, a much more

extended territory, but within which, along the walls of the canyons in the vicinity of the bridges, are found many prehistoric ruins of cavern and cliff dwellings. There are also two cavern springs containing some prehistoric ruins, which are located approximately 13 and 19 miles southeast of the bridges, respectively. These cavern springs are included within the Natural Bridges Monument. They are located upon the ancient and only trail to the bridges from the south, and are important way stations in the desert surrounding this monument.

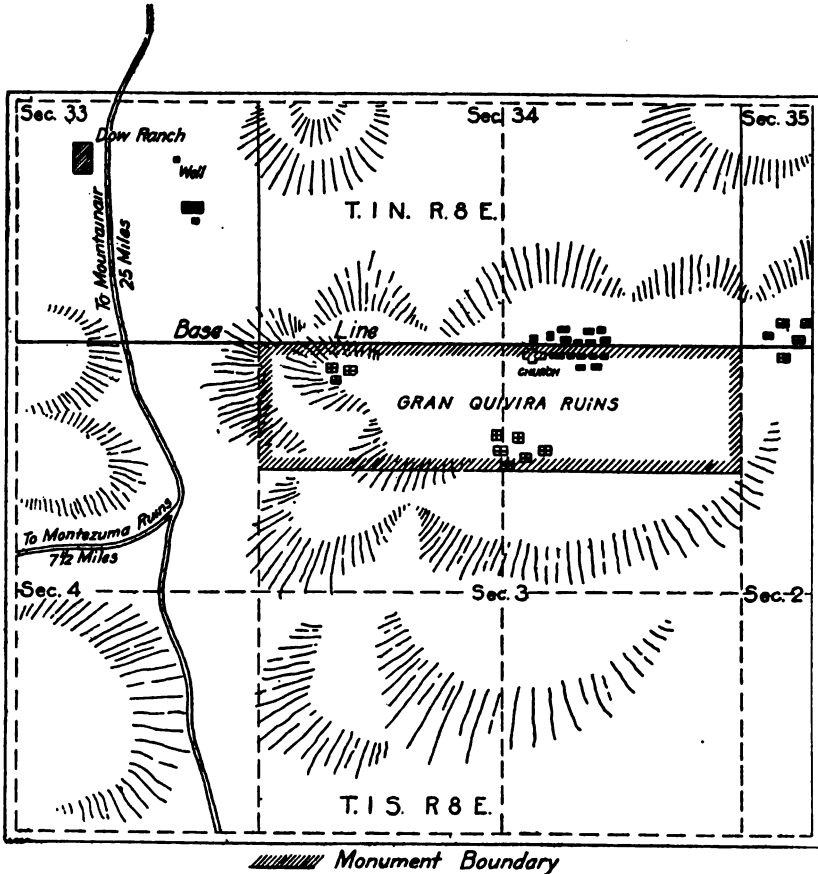


FIG. 14.—Gran Quivira National Monument, N. Mex., embracing unsurveyed N. $\frac{1}{4}$ N. $\frac{1}{4}$ sec. 3, T. 1 S., R. 8 E., New Mexico principal meridian; created November 1, 1909.

GRAN QUIVIRA NATIONAL MONUMENT.

The Gran Quivira has long been recognized as one of the most important of the earliest Spanish church or mission ruins in the Southwest. Near by are numerous Indian pueblo ruins, occupying an area many acres in extent, which also, with sufficient land to protect them, was reserved. The outside dimensions of the church ruins, which is in the form of a short-arm cross, are about 48 by 140 feet, and its walls are from 4 to 6 feet thick and from 12 to 20 feet high.

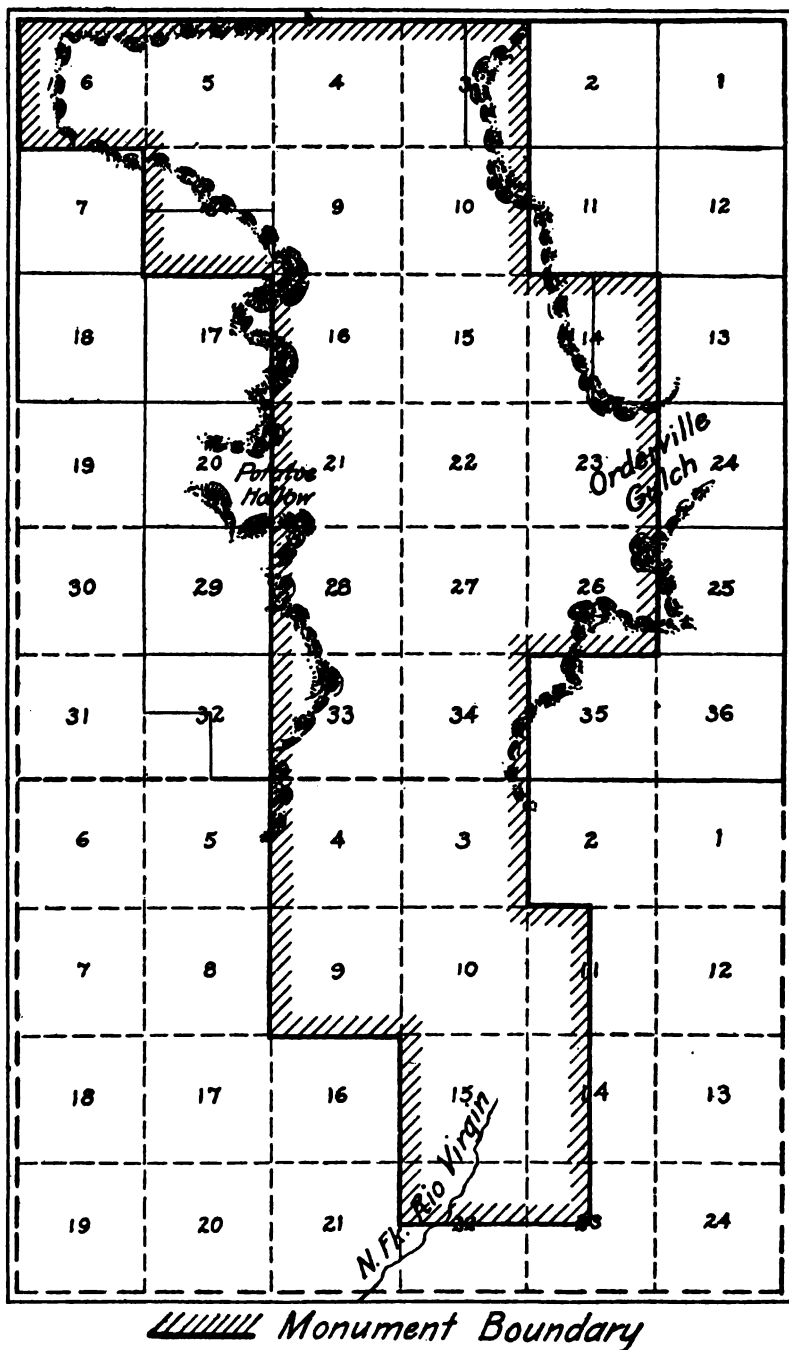


FIG. 15.—Mukuntuweap National Monument, Utah, embracing secs. 3, 4, 5, 6, 8, 9, 10, 14, 15, 16, 21, 22, 23, 26, 27, 28, 33, and 34, T. 40 S., R. 10 W., and all of the Mukuntuweap Canyon in T. 41 S., R. 10 W., Salt Lake meridian; created July 31, 1909.

The Gran Quivira National Monument is located $1\frac{1}{2}$ miles outside of the exterior boundaries of the Manzano National Forest, and is remote from the headquarters of any officer of this department.

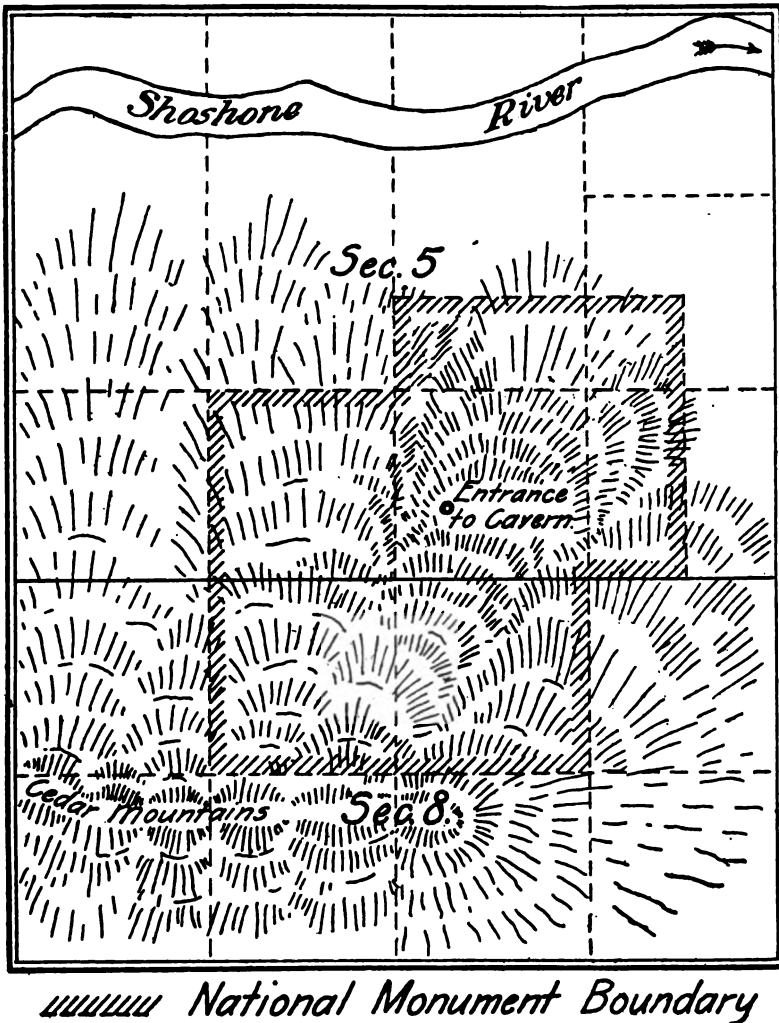


FIG. 16.—Shoshone Cavern National Monument, Wyo., embracing the SW. $\frac{1}{4}$ SE. $\frac{1}{4}$, W. $\frac{1}{4}$ SE. $\frac{1}{4}$ SE. $\frac{1}{4}$, SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ SE. $\frac{1}{4}$, S. $\frac{1}{4}$ NW. $\frac{1}{4}$ SE. $\frac{1}{4}$; and SE. $\frac{1}{4}$ SW. $\frac{1}{4}$, sec. 5; the NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ and NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 8, T. 52 N., R. 102 W., sixth principal meridian; created September 21, 1909.

MUKUNTUWEAP NATIONAL MONUMENT.

The Mukuntuweap National Monument, Utah, embraces the magnificent gorge of Zion Creek, called the Mukuntuweap Canyon by the Powell Topographic Survey of southwestern Utah, Kanab sheet, and the same is of the greatest scientific interest. The canyon walls are

smooth, vertical sandstone precipices, from 800 to 2,000 feet deep. These walls are unscalable within the limits of the boundaries of the reserve, except at one point about 4 miles from the southern and 6 miles from the northern extremity. The North Fork of the Rio Virgin passes through the canyon, and it is stated that the views into the canyon from its rim are exceeded in beauty and grandeur only by the similar views into the Grand Canyon of the Colorado.

At intervals along the west wall of the canyon are watercourses which cross the rim and plunge into the gorge in waterfalls 800 to 2,000 feet high.

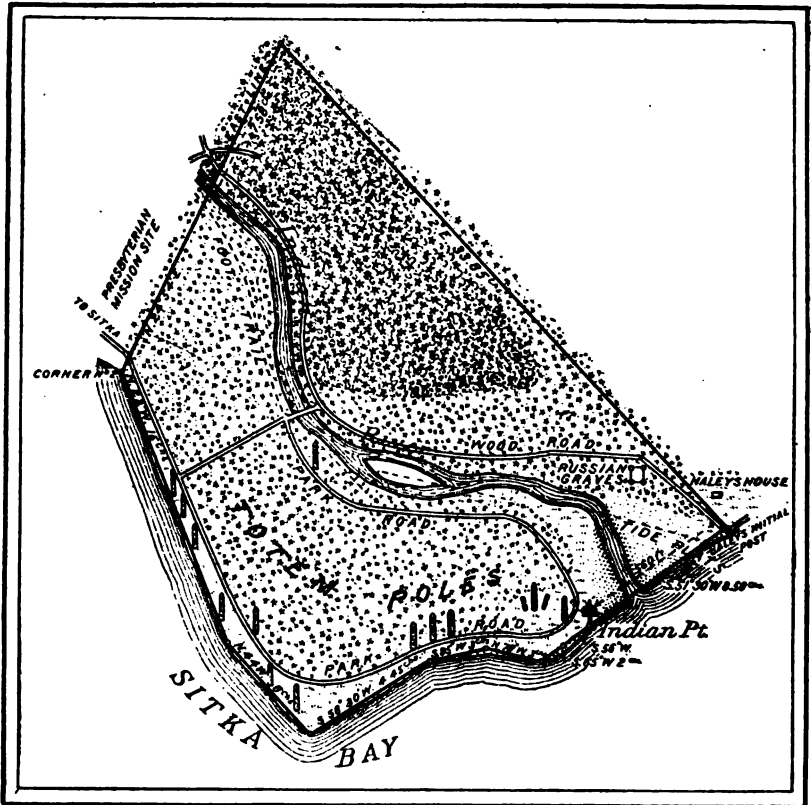


FIG. 17.—Sitka National Monument, Alaska, embracing a tract of land which includes the mouth of Indian River and adjacent territory near Sitka; created March 23, 1910.

SHOSHONE CAVERN NATIONAL MONUMENT.

The Shoshone Cavern National Monument embraces 210 acres of rough, mountainous land. The cavern entrance is located upon the north face of Cedar Mountain, about 3 miles east of the great Shoshone Dam in Big Horn County, Wyo. From its entrance the cavern runs in a southwesterly direction for more than 800 feet, if measured in a direct line. The route which must be traveled to reach this depth within the mountain, however, is so winding and irregular that at least a mile is passed before the terminus is reached.

There are en route many dark pits and precipices of unknown depth and therefore of a special interest. The various chambers and passages are beautifully decorated with a sparkling crust of limestone crystals and from the roof hang myriads of stalactites.

SITKA NATIONAL MONUMENT, ALASKA.

This monument reservation, created under the act of June 8, 1906, embraces about 57 acres of comparatively level gravel plain formed by sea wash and by the deposits of Indian River, which flows through the tract. Upon this ground was located formerly the village of a warlike tribe—the Kik-Siti Indians—who, in 1802, massacred the Russians in old Sitka and thereafter fortified themselves and de-

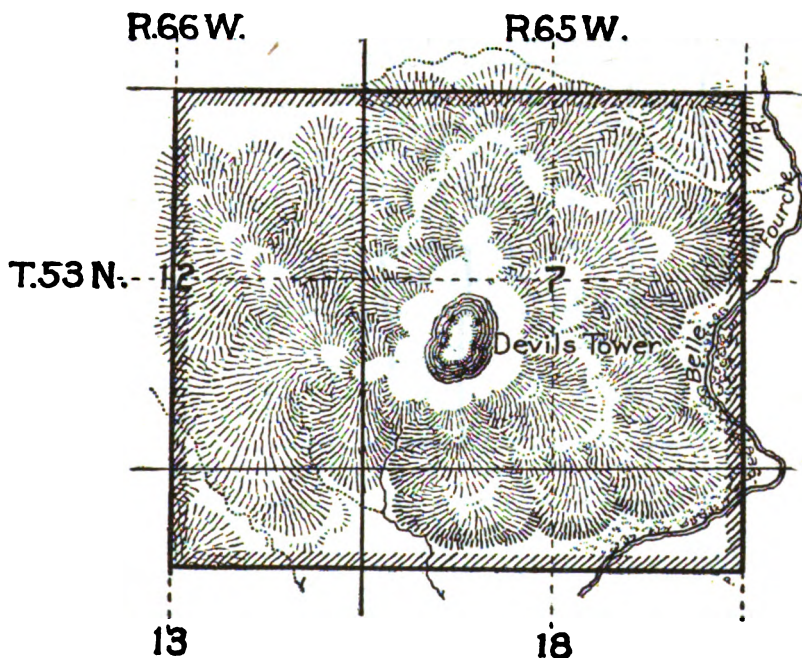


FIG. 18.—Devils Tower National Monument, Wyo., embracing sec. 7 and the N. $\frac{1}{2}$ NE. $\frac{1}{2}$, the NE. $\frac{1}{2}$ NW. $\frac{1}{2}$, and lot No. 1, sec. 18, T. 53 N., R. 65 W.; the E. $\frac{1}{2}$ sec. 12 and the N. $\frac{1}{2}$ NE. $\frac{1}{2}$ sec. 13, T. 53 N., R. 66 W., sixth principal meridian; created September 24, 1906.

fended their village against the Russians under Baranoff and Lisianski. Here also are the graves of a Russian midshipman and six sailors, who were killed in a decisive battle in 1804. A celebrated "witch tree" of the natives and 16 totem poles, several of which are examples of the best work of the savage genealogists of the Alaska clans, stand sentrylike along the beach.

DEVILS TOWER NATIONAL MONUMENT.

This extraordinary, natural monument has been known and utilized, doubtless, from time immemorial by the aborigines of the plains and mountains, for the American Indian of the last century was

found to be directing his course to and from the hunt and foray by reference to this lofty pile. In their turn the white pioneers of civilization in their explorations of the great Northwest which began with the expedition of the Verendryes, pathfinders of the French colonies of Canada, in 1742, utilized the tower as a landmark, and still later the military expeditions into the Sioux and Crow Indian country during the Indian wars of the last century carried on operations within sight of the Devils Tower or directed their march by the aid of its ever-present beacon, for the tower is visible in some directions in that practically cloudless region for nearly 100 miles.

PINNACLES NATIONAL MONUMENT.

There are two groups of the so-called Pinnacles Rocks, known locally as the Big Pinnacles and the Little Pinnacles. The general

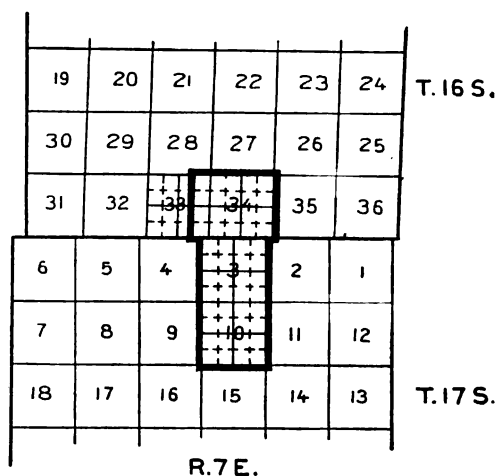


FIG. 19.—Pinnacles National Monument, Cal.; created January 16, 1908.

characteristics of the two groups are similar. Each covers an area of about 160 acres, very irregular in outline.

The name is derived from the spirelike formations rising from 600 to 1,000 feet from the floor of the canyon, forming a landmark visible many miles in every direction. Many of the rocks are so precipitous that they can not be scaled. A series of caves, opening one into the other, lie under each of the groups of rock. These caves vary greatly in size, one in particular, known as the Banquet Hall, being about 100 feet square with a ceiling 30 feet high. The caves are entered through narrow canyons, with perpendicular rock walls and overhanging boulders. One huge stone, called the Temple Rock, is almost cubical in form. It stands alone in the bottom of the canyon and its walls rise perpendicularly to a height of over 200 feet. There are also several specimens of "balancing rocks" in each of the groups.

COLORADO NATIONAL MONUMENT.

This area was set aside as a national monument by the President's proclamation of May 24, 1911, and is the latest monument to be created.

It is situated near Grand Junction, Colo., and the site is in a picturesque canyon, which has long been an attractive feature of that

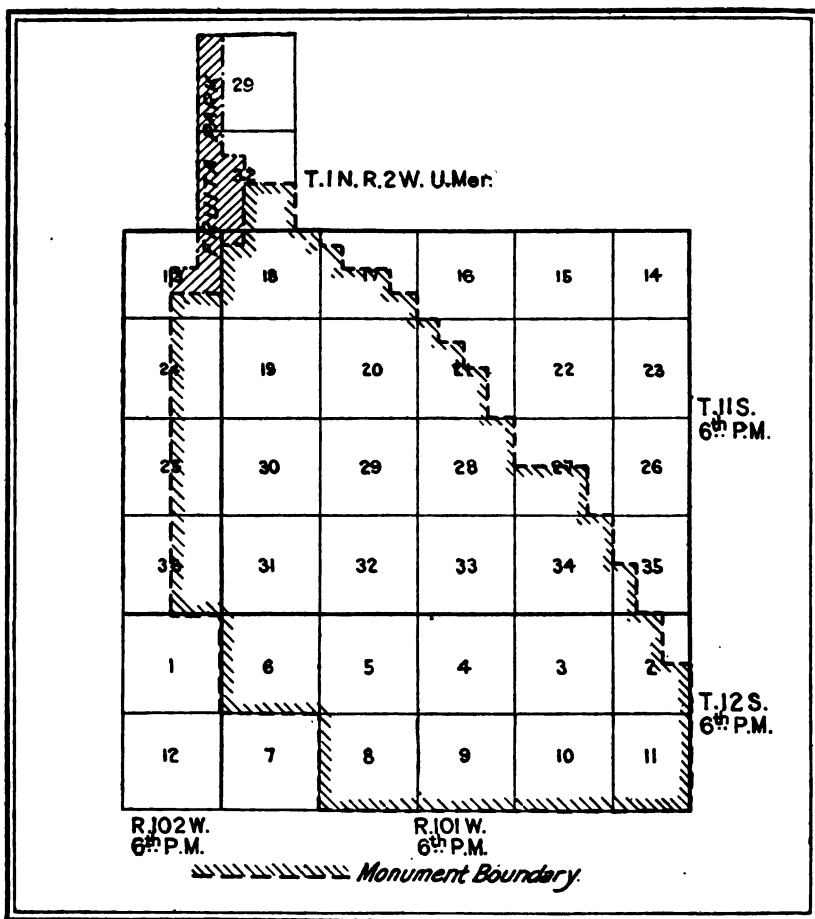


FIG. 20.—Colorado National Monument, Colo., embracing parts of Tps. 11 and 12 S., Rs. 101 and 102 W. of the sixth principal meridian, and part of sec. 32, T. 1 N., R. 2 W. of the Ute meridian, Colorado, containing 13,833.06 acres.

portion of the State. The formation is similar to that of the Garden of the Gods at Colorado Springs, Colo., only much more beautiful and picturesque. With the exception of the Grand Canyon of the Colorado it exhibits probably as highly colored, magnificent, and impressive examples of erosion, particularly of lofty monoliths, as may be found anywhere in the West. These monoliths are located in several tributary canyons. Some of them are of gigantic size,

one being over 400 feet high, almost circular in cross section, and 100 feet in diameter at base.

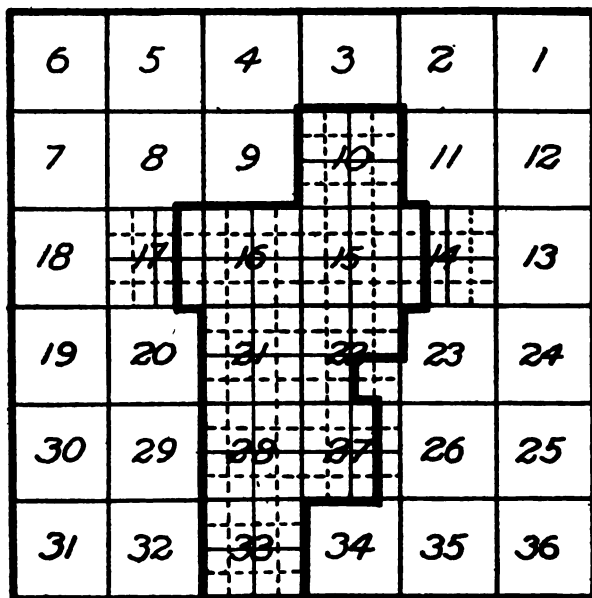


FIG. 21.—Cinder Cone National Monument, within Lassen Peak National Forest, Cal.

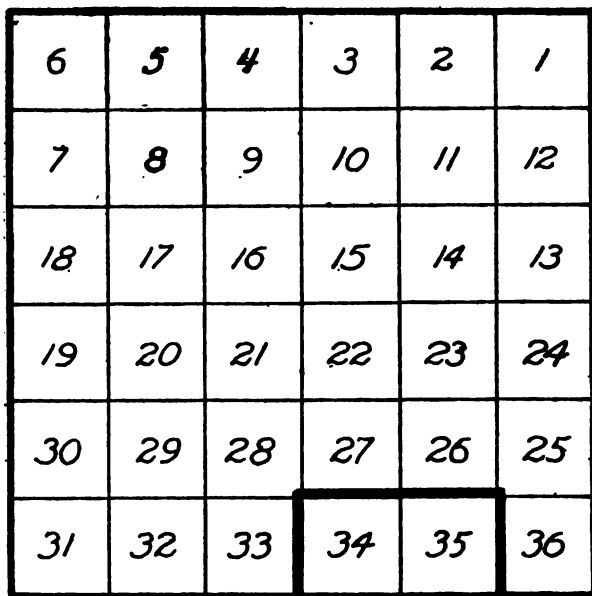


FIG. 22.—Lassen Peak National Monument, within Lassen Peak National Forest, Cal.

CINDER CONE NATIONAL MONUMENT.

The Cinder Cone National Monument was created by proclamation dated May 6, 1907. It is situated within the Lassen Peak National

Forest, and with the adjacent area, embracing a lava field and Snag Lake and Lake Bidwell, is of scientific interest as illustrative of volcanic activity, and is of special importance in tracing the history of the volcanic phenomena of that vicinity.

LASSEN PEAK NATIONAL MONUMENT.

The Lassen Peak National Monument was created by proclamation dated May 6, 1907. It is situated within the Lassen Peak National Forest and marks the southern terminus of the long line of extinct

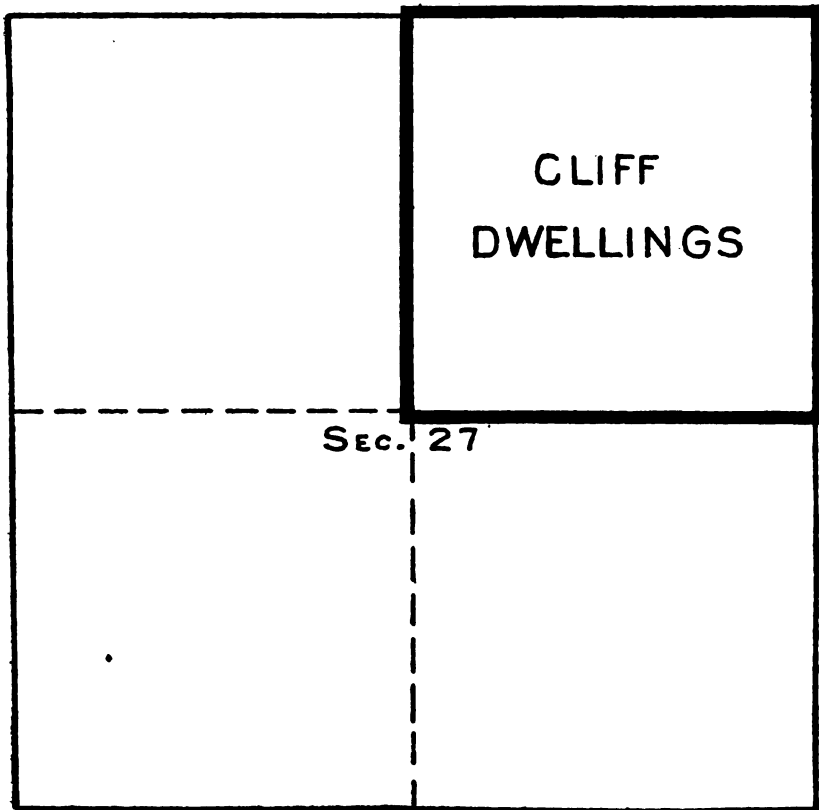


FIG. 23.—Gila Cliff-Dwellings National Monument, within Gila National Forest, N. Mex., embracing NE. $\frac{1}{4}$ of sec. 27, T. 12 S., R. 14 W., New Mexico principal meridian and base.

volcanoes in the Cascade Range, from which one of the greatest volcanic fields in the world extends, and is of special importance in tracing the history of the volcanic phenomena of that vicinity.

GILA CLIFF-DWELLINGS NATIONAL MONUMENT.

The Gila Cliff-Dwellings National Monument was created by proclamation dated November 16, 1907. These cliff-dweller ruins are neither very large nor very important, but are located in a district in which few prehistoric ruins are found.

TONGO NATIONAL MONUMENT.

The Tonto National Monument was created by proclamation dated December 19, 1907. It is located in Gila County, Ariz., and embraces two prehistoric ruins of cliff dwellings located somewhat less than 2 miles south of the Salt River Reservoir constructed by the Reclamation Service in the valley of the Salt River within the Tonto Basin, and is about 5 miles southeasterly from the town of Roosevelt. The prehistoric ruin is situated in the high, flaring entrance to a large, shallow cavern, is three stories high, approximately 60 feet wide and 30 feet deep, and contains 14 or more rooms.

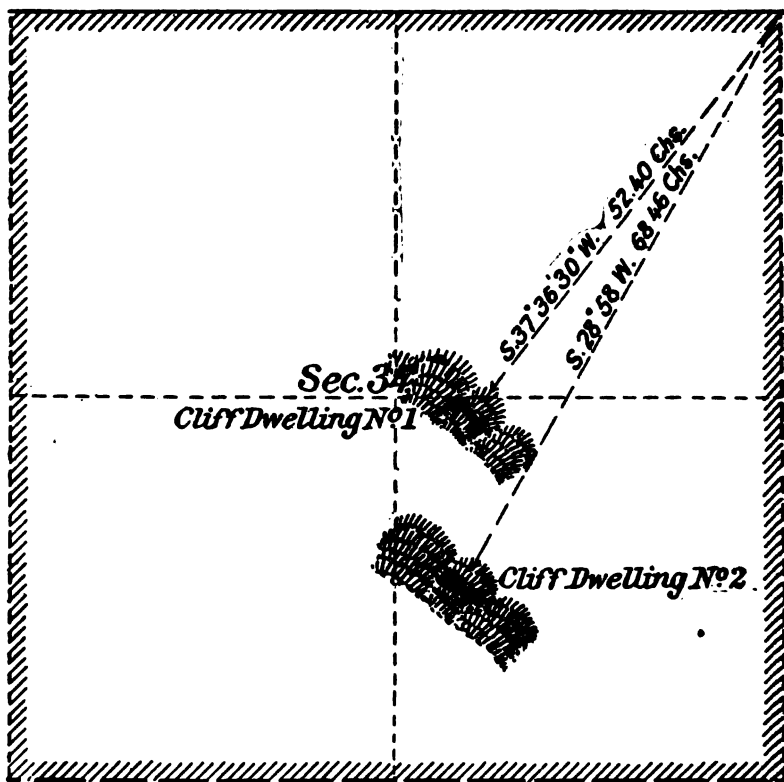


FIG. 24.—Tonto National Monument, unsurveyed sec. 34, T. 4 N., R. 12 E., Gila and Salt River meridian, Ariz., containing 640 acres.

GRAND CANYON NATIONAL MONUMENT, ARIZ.

A considerable portion of the area set aside by the proclamation creating this national monument is covered by three different proclamations, one of which created the Grand Canyon Forest Reserve, one the game preserve embracing that part of the national forest north of the river, and the third the monument proclamation. It is believed that the most wonderful portion of the canyon is contained within the present limits of the national monument and game preserves.

Steps have been taken to create a national park of the Grand Canyon of the Arizona, and a bill (H. R. 6331) providing for such purpose was introduced in Congress April 20, 1911, and is now pending before that body. The Association of American Geog-

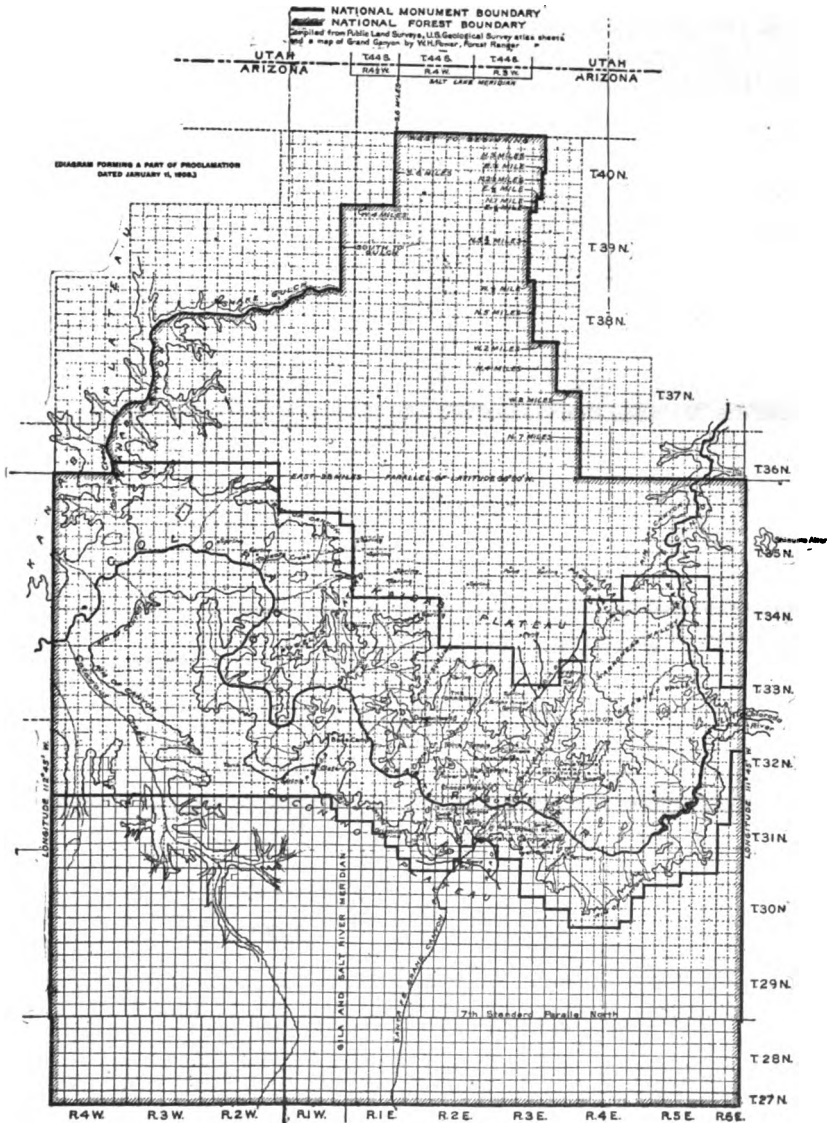


FIG. 25.—Grand Canyon National Monument, within Grand Canyon National Forest, Ariz.

raphers has recommended that the above-mentioned park be designated as Powell National Park, and the Geological Society of America has approved the naming of the national park in the Grand Canyon of the Colorado after its explorer, Maj. J. W. Powell.

JEWEL CAVE NATIONAL MONUMENT.

Jewel Cave, which is located 13 miles west and south of Custer, the county seat of Custer County, S. Dak., was discovered on August 18, 1900, by two prospectors, Albert and F. W. Michaud, whose attention was attracted by the noise of wind coming from a small hole in the limestone cliffs on the east side of Hell Canyon. In the hope of discovering some valuable mineral and the source of the wind, these men, in company with one Charles Bush, enlarged the

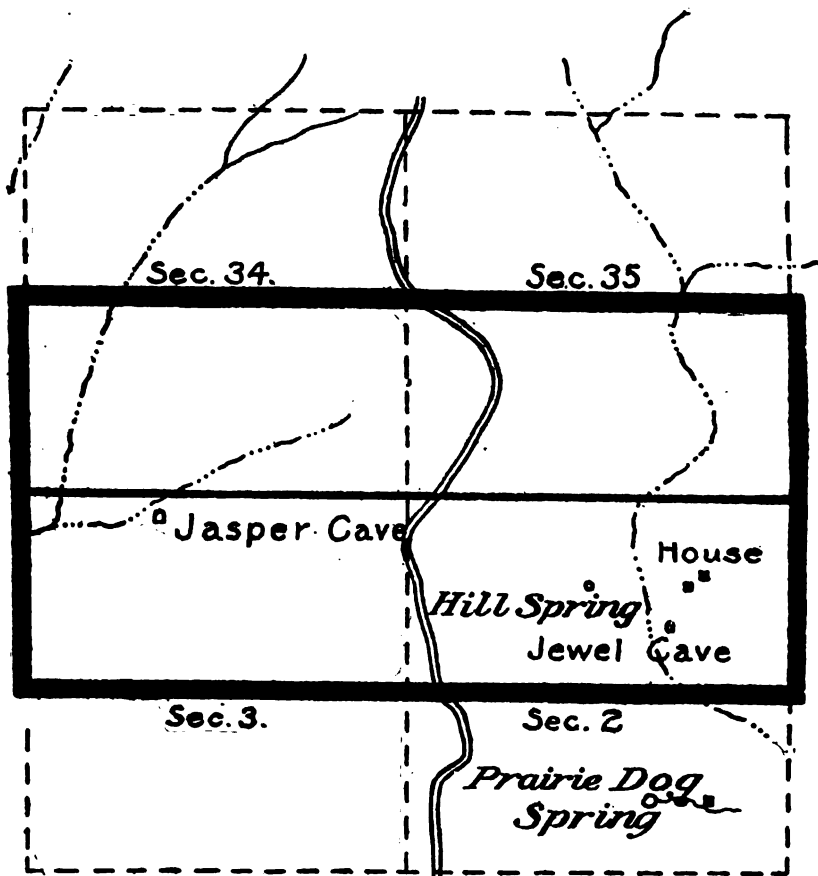


FIG. 26.—Jewel Cave National Monument, within Black Hills National Forest, S. Dak., Tps. 3 and 4 S., R. 2 E., Black Hills meridian.

opening. Jasper and manganese are found in the cave, but to what extent is not definitely known.

The prospectors have followed the main descending wind passage for a distance of $1\frac{1}{2}$ miles, which point the explorers believe to be from 600 to 700 feet below the entrance, and have explored numerous side galleries and passages. However, the cave is far from being fully explored.

The cave, as far as known, is located in limestone formation and is apparently the result of action of water. A prominent geologist who

visited this cave believes it to be an extinct geyser channel. The cave, as far as explored, consists of a series of chambers, connected by narrow passages with numerous side galleries, which increase in size as the distance from the entrance becomes greater.

The explorers have been careful observers of the action of the wind within the cave. They have discovered that ordinarily the wind blows in and out of the cave for regular periods, the periods of blowing in and out being 15 hours each, although they have known the periods to be of 72 hours' duration. Other wind passages have been discovered in the vicinity of the cave.

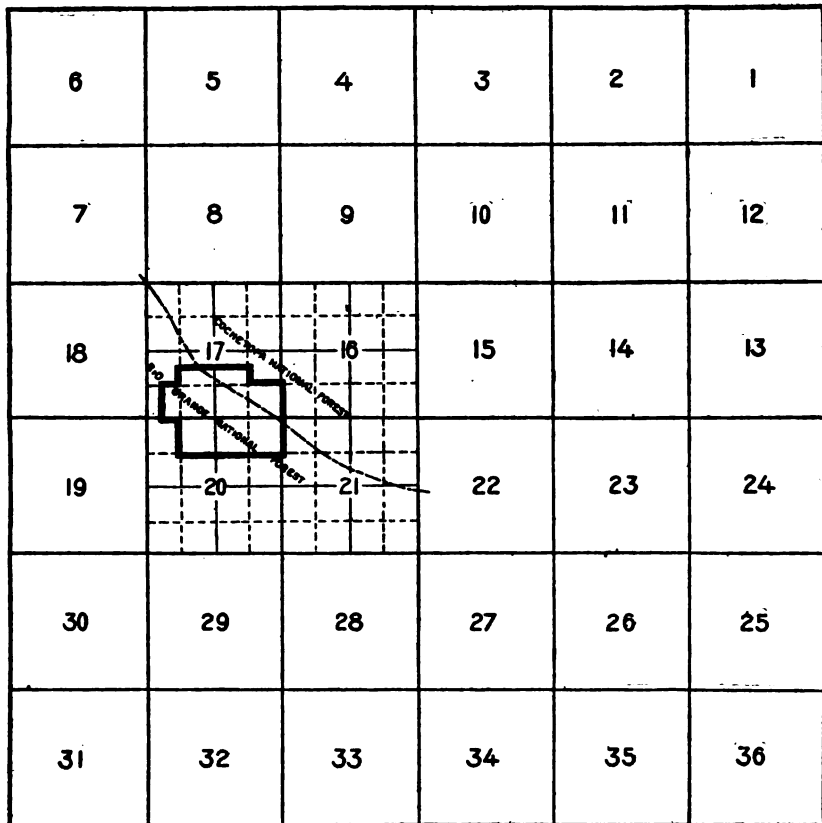


FIG. 27.—Wheeler National Monument, within Cochetopa and Rio Grande National Forests, Colo., T. 42 N., R. 2 E., New Mexico principal meridian and base.

WHEELER NATIONAL MONUMENT, COLO.

The lands embraced in this national monument are situated near the headwaters of the middle fork of Bellows Creek, a northern tributary of the Rio Grande del Norte, about 10 miles northeast of Wagon Wheel Gap, Colo., and 2 miles south of the crest of the Continental Divide.

The tract lies on the southern slope of the ridge which forms the crest of the Continental Divide. It is traversed from north to south

by numerous deep canyons with very precipitous sides, the intervening ridges being capped by pinnacle like rocks, making it practically impossible to cross the tract from east to west, even on foot. There are also many crevices cutting the ridges transversely, making an intricate net work of ravines separated by broken, precipitous ledges and broken mesas.

It is probable that the formation found here is the result of a succession of outpourings of lava and showers of volcanic ash which have left a series of nearly horizontal strata of varying degrees of hardness. Numerous pebbles and breccia of a flint like rock are embedded in the softer lavas which were probably gathered up by the flowing lava mud from the original bedrock. The formation is for the most part scoriaceous tufa and trachyte, with some rhyolite. The effect of erosion on this formation has been to cut it into sharply defined forms of many kinds. The harder broken rocks embedded in the lavas have acted as veritable chisels, greatly accelerating erosive action and making the lines and angles more sharply defined than would be the case in ordinary weathering. This erosion is still going on at a remarkably rapid rate, making the place very interesting from the geological point of view.

The fantastic forms resulting from the rapid erosion make this spot one of exceptional beauty. The numerous winding canyons, broken ridges, pinnacles, and buttes form such striking and varied scenes that it will be much visited by tourists when it has been made accessible by the construction of roads and trails.

From the most reliable data it is believed that the ill-fated expedition of John C. Fremont, in 1848, reached this immediate vicinity, when disaster came upon the party, compelling it to turn back. Skeletons of mules, bits of harness, and camp equipage are found here, lending force to the recorded data.

MOUNT OLYMPUS NATIONAL MONUMENT, WASH.

This monument was set aside by presidential proclamation of March 2, 1909, and contained approximately 608,640 acres. It was created for the purpose of preserving many objects of great and unusual scientific interest, embracing numerous glaciers, and the territory has also been from time immemorial the summer range and breeding ground of the Olympic elk, a species which is rapidly decreasing in numbers. A bill was introduced in Congress on July 15, 1911, providing for the setting aside as a national park the same tract of land as was set aside by proclamation of the President creating the Mount Olympus National Monument.

By presidential proclamation of April 17, 1912, certain lands have been eliminated from the original area embraced in the monument. This proclamation providing therefor is as follows:

I, WILLIAM H. TAFT, President of the United States of America, by virtue of the power in me vested by section 2 of the act of Congress approved June 2, 1906, entitled "An act for the preservation of American antiquities," do hereby declare and proclaim that the south half of the southwest quarter of section twenty-one, and the north half of the northwest quarter of section twenty-eight, in township twenty-four north, range eight west, Willamette meridian, Washington, be, and the same are hereby, eliminated from the Mount Olympus National Monument. The provisions of the proclamation of March 2, 1909,

shall remain in full force and effect as to all other lands thereby reserved as a national monument.

In witness whereof I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the city of Washington this seventeenth day of April, in the [SEAL.] year of our Lord one thousand nine hundred and twelve, and of the Independence of the United States the one hundred and thirty-sixth.

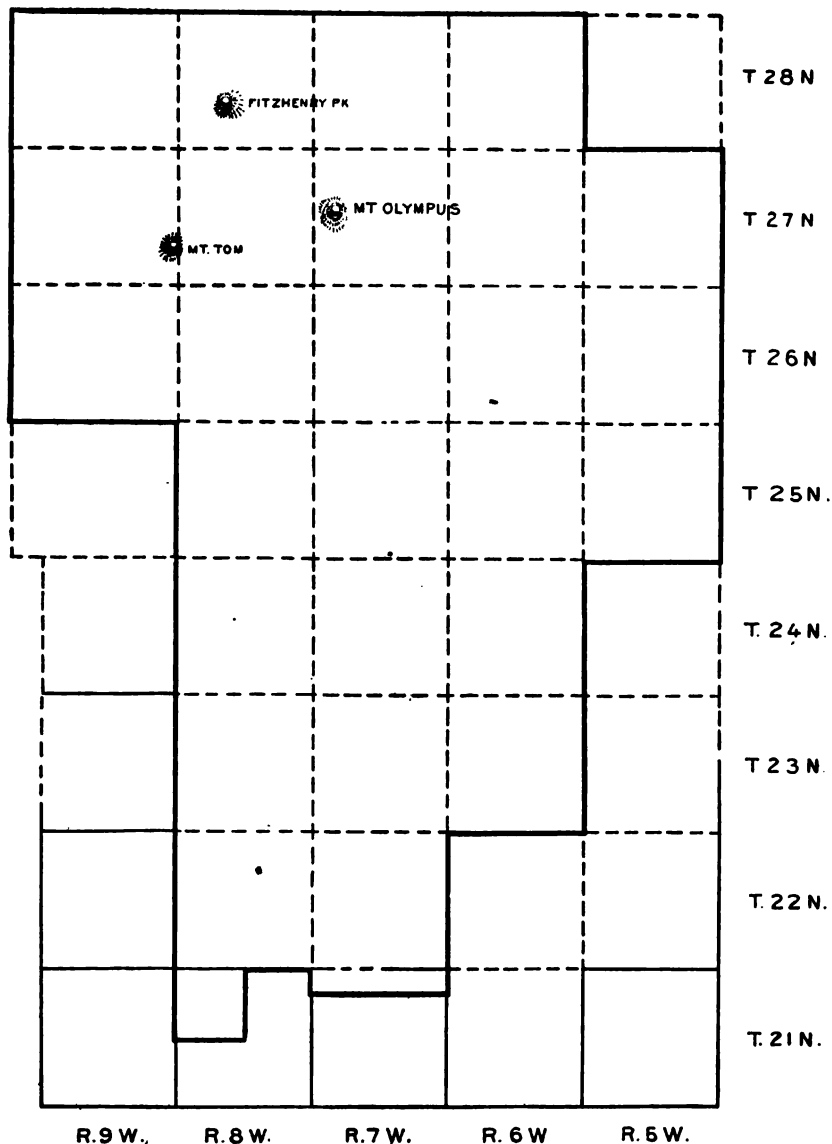


FIG. 28.—Mount Olympus National Monument, within Olympic National Forest, Wash.

OREGON CAVES NATIONAL MONUMENT, OREG.

The Oregon Caves or "Marble Halls" of Josephine County, discovered in 1874, are located in the Siskiyou National Forest, about 30

miles south of Grants Pass in Cave Mountain, a peak of the Grey-back Range, that divides the headwaters of the Applegate and Illinois Rivers, and connects with the Siskiyou Mountains near the north line of California.

Cave Mountain, the peak which contains these caves, rises to an elevation of about 6,000 feet, and is of limestone formation. The

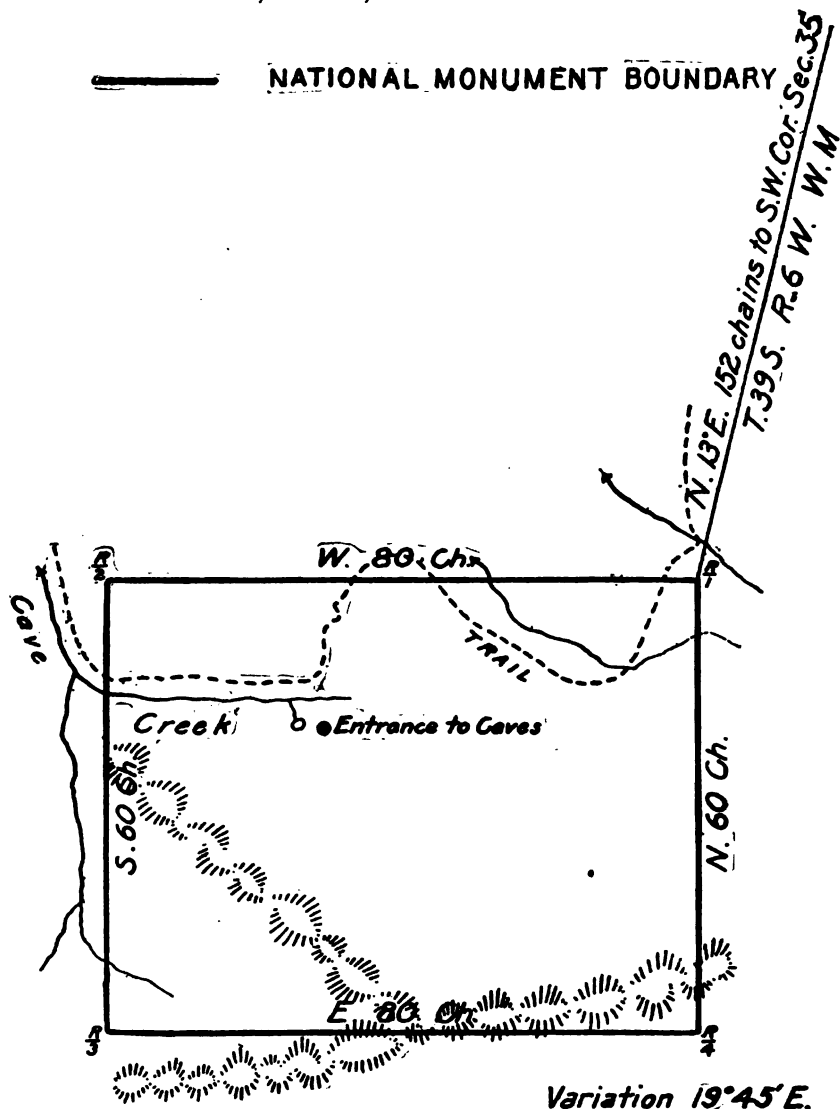


FIG. 29.—Oregon Caves National Monument, within Siskiyou National Forest, Oreg.

main openings around which the national monument has been created are at an elevation of 4,000 feet, but the entire mountain side for 5 or 6 miles shows caverns of various sizes and in all probability throughout its interior is honeycombed like the portion that has been explored.

tect the valuable forest surrounding and to make the caves more accessible to tourists.

DEVILS POSTPILE NATIONAL MONUMENT, CAL.

The Devils Postpile consists of basaltic rocks laid down in the form of an immense pile of posts, and while there are similar formations in different parts of the country, this is especially prominent, being one of the most noted of its kind on the continent and said to rank with the famous Giants Causeway on the coast of Antrim, in the north of Ireland.

Below the postpile and above the junction of King Creek and the middle fork of the San Joaquin River is Rainbow Falls, similar to the well-known Vernal Falls of the Yosemite Valley, and one of the few of its kind on the continent.

BIRD RESERVES.

All of the bird reserves have been created through reference from the Interior Department to the President of forms of Executive orders providing therefor. These reserves are regarded as in all essential particulars reservations of public lands for public use or other purposes, for which there are numerous precedents. The first specific act of Congress providing for the protection of birds by bird reserves created by Executive order was introduced by Hon. John F. Lacy, of Iowa, and became a law on June 28, 1906. (34 Stat., 536.) This act made it unlawful to kill birds, to take their eggs, or to willfully disturb birds upon the reservations, and it provides a fine of not exceeding \$500 or imprisonment for not exceeding six months, or both fine and imprisonment, for each conviction secured. This law was substantially reenacted in the new penal code approved March 4, 1909 (35 Stat., 1104), in the following language:

Sec. 84. Whoever shall hunt, capture, wilfully disturb, or kill any bird of any kind whatever, or take the eggs of any such bird, on any lands of the United States which have been set apart or reserved as breeding grounds for birds by any law, proclamation, or Executive order, except under such rules and regulations as the Secretary of Agriculture may from time to time prescribe, shall be fined not more than five hundred dollars or imprisoned not more than six months, or both.

The reservations now existing, which are being administered under the direction of the Biological Survey, Department of Agriculture, are 56 in number, as follows:

Bird reserves created.

Name of reservation.	Date.	Location.	Area.
Pelican Island.....	Mar. 14, 1903	East Florida coast.....	5.50 acres.
Breton Island.....	(Oct. 4, 1904 Nov. 11, 1905	Southeast coast of Louisiana.....	Unknown.
Stamp Lake.....	Mar. 9, 1905	North Dakota.....	27.39 acres.
Huron Islands.....	Oct. 10, 1905	Lake Superior, Mich.....	Unknown.
Siskiwit Islands.....	do.....	do.....	Do.
Passage Key.....	do.....	Tampa Bay, Fla.....	36.37 acres.
Indian Key.....	Feb. 10, 1906	do.....	90 acres.
Vern Islands.....	Aug. 8, 1907	Mouths of Mississippi River, La.....	Unknown.
Shell Keys.....	Aug. 17, 1907	South Louisiana coast.....	Do.
Three Arch Rocks.....	Oct. 14, 1907	West Oregon coast.....	Do.
Flattery Rocks.....	Oct. 23, 1907	West Washington coast.....	Do.
Quillayute Needles.....	do.....	do.....	Do.

REPORT ON PLATT AND WIND CAVE NATIONAL PARKS, ETC. 803

Bird reserves created—Continued.

Name of reservation.	Date.	Location.	Area.
Copalis Rock.....	Oct. 23, 1907	West Washington coast.....	Unknown.
East Timberlaine Island.....	Dec. 7, 1907	South Louisiana coast.....	Do.
Mosquito Inlet.....	Feb. 24, 1908	East Florida coast.....	Do.
Tortugas Keys.....	Apr. 6, 1908	Florida Keys, Fla.....	Do.
Klamath Lake.....	Aug. 8, 1908	Oregon and California.....	Do.
Key West.....	do.....	Florida Keys, Fla.....	Do.
Lake Malheur.....	Aug. 18, 1908	Oregon.....	Do.
Chase Lake.....	Aug. 28, 1908	North Dakota.....	Do.
Pine Island.....	Sept. 15, 1908	West Florida coast.....	Do.
Matlacha Pass.....	Sept. 26, 1908	do.....	Do.
Palma Sola.....	do.....	do.....	Do.
Island Bay.....	Oct. 23, 1908	Florida.....	Do.
Loch Katrina.....	Oct. 26, 1908	Wyoming.....	Do.
Hawaiian Islands.....	Feb. 3, 1909	Hawaii.....	Do.
East Park.....	Feb. 25, 1909	California.....	Do.
Cold Springs.....	do.....	Oregon.....	Do.
Shoshone.....	do.....	Wyoming.....	Do.
Pathfinder.....	do.....	do.....	Do.
Bellefourche.....	do.....	South Dakota.....	Do.
Strawberry Valley.....	do.....	Utah.....	Do.
Salt River.....	do.....	Arizona.....	Do.
Deer Flat.....	do.....	Idaho.....	Do.
Minidoka.....	do.....	do.....	Do.
Willow Creek.....	do.....	Montana.....	Do.
Carlsbad.....	do.....	New Mexico.....	Do.
Rio Grande.....	do.....	do.....	Do.
Keechelus Lake.....	do.....	Washington.....	Do.
Kachess Lake.....	do.....	do.....	Do.
Cealum Lake.....	do.....	do.....	Do.
Bumping Lake.....	do.....	do.....	Do.
Conconully.....	do.....	do.....	Do.
Bering Sea.....	Feb. 27, 1909	Alaska.....	Do.
Pribilof.....	do.....	do.....	Do.
Tuxedni.....	do.....	do.....	Do.
Farallon.....	do.....	California.....	Do.
Culebra.....	do.....	Porto Rico.....	Do.
Yukon Delta.....	do.....	Alaska.....	Do.
St. Lazaria.....	do.....	do.....	Do.
Bogoslof.....	Mar. 2, 1909	do.....	Do.
Clear Lake.....	Apr. 11, 1911	California.....	Do.
Forrester Island.....	Jan. 11, 1912	Alaska.....	Do.
Hazy Islands.....	do.....	do.....	Do.
Niobrara.....	do.....	Nebraska.....	¹ 14,640 acres.
Green Bay.....	Feb. 21, 1912	Wisconsin.....	1.87 acres.

¹ Approximate area.

BIRD RESERVES ENLARGED AND REDUCED.

Pelican Island.....	Jan. 26, 1909	Florida (enlarged).....	Unknown.
Mosquito Inlet.....	Apr. 2, 1909	do.....	Do.
Cold Springs.....	Nov. 25, 1911	Oregon (enlarged).....	Do.
Clear Lake.....	Jan. 13, 1912	California (reduced).....	Do.
Minidoka.....	Feb. 21, 1912	Idaho (enlarged).....	Do.
Niobrara.....	Nov. 14, 1912	Nebraska (enlarged).....	¹ 15,253.7 acres.

¹ Approximate area.

Four new bird reserves were created during the year, viz, Forrester Island and Hazy Islands, in Alaska; the Niobrara Reserve, in Nebraska (which has since been enlarged); and the Green Bay Reserve in Wisconsin. The three reserves first named were created on January 11, 1912, and the last on February 21, 1912. A number of these reservations lie within tracts reserved or set aside for purposes other than the protection of birds, such as reclamation withdrawals and naval reserves, but in all such cases the administration of the bird reservation is made subject to the use of the reservation under the primary and more important segregation.

**REPORT OF THE SUPERINTENDENT OF THE
HOT SPRINGS RESERVATION.**

805

REPORT OF THE SUPERINTENDENT OF THE HOT SPRINGS RESERVATION.

INTRODUCTION.

HOT SPRINGS, ARK., *August 23, 1912.*

SIR: I have the honor to respectfully submit my annual report for the fiscal year ended June 30, 1912.

This is the third annual report of the affairs of this reservation since I assumed charge, and I can not paint in too optimistic colors the many improvements which have and are constantly taking place, and as the curtain which separates the months from the years and the years from the centuries is shifted the past year will be memorable for many years to come to this resort, for the reason that it saw the beginning of a new era in the administration under governmental control of these waters by the opening for service of three of as magnificent modern and palatial bathhouses as are in all the world. This is the beginning of an era creating conditions of benefit to the bathers which will unquestionably bring relief and cures to countless thousands, as the fame of these wonderful waters is increasing each year; and while the past year fails to show an equal volume of business done by the bathhouses compared with last year it must be considered, first, that there were in the early part of the year many disastrous floods, devastating a large area of country which furnished thousands of patrons. This, together with the political conditions, and many things have in a measure conspired to prevent many coming who otherwise would have come, as in former years; also the fact that the three largest bathhouses were closed down during the latter part of last year doubtless retarded many from coming. As a whole, the business, while not equal to that of last year, far exceeds that of any former year, and I predict from now on an annual increase. Another fact which is gratifying in the extreme is the class of visitors as compared with other years. From this standpoint this year saw the highest class of visitors ever seen here. Men of national and international reputation came here for the first time, because they believed that the Government was doing things to improve conditions, and no stronger argument can be advanced than that the Government insures to every visitor here fair and honest treatment and the use of waters unequalled in curative qualities of any in the world.

While the business of the bathhouses did not equal that of last year, the records show more visitors than last year; for instance, the arrivals for March, 1910, were 14,878; for March, 1911, 18,793; and for March, 1912, 18,982. Many visitors come to enjoy the magnificent and unsurpassed climatic and other attractions which abound here, so that under existing conditions the recreation and pleasure side of the resort is being recognized as well as the rejuvenating waters.

To afford an idea as to improved conditions, I refer to the annual reports of former years. The year 1903 was, up to that time, a very exceptional year—prosperous and good. The total number of paid baths in that year was 518,759; the total receipts for all bathhouses were \$165,426.70. For the past year the total number of

paid baths was 659,648, and the total receipts of all bathhouses were \$229,277.93. For the year 1911, which was far ahead of any former year, the total number of paid baths was 774,437, and the total receipts of all bathhouses were \$253,314.32. Doubtless much of the difference between this and last year, in addition to other reasons assigned, may be attributed to the annual reunion of the old Confederates at Little Rock in May, 1911, many of whom, together with others in attendance at the reunion, came here for the baths.

VISITORS.

The number of visitors here for the year was approximately 135,000. Such a record of visitors to these healing waters must be taken as almost a universal indorsement of their wonderful curative powers, a divine preparation for the alleviation and relief of suffering humanity; and in passing I may be pardoned if I say I have seen many cures effected here this year that are almost beyond belief.

BATHHOUSES.

On January 20, 1912, the following schedule for baths at the various bathhouses, was prescribed by the department.

Table of maximum rates for single baths and course of 21 baths, exclusive of attendants' fees.

Name of bathhouse.	Single bath.	Course of 21 baths.	Name of bathhouse.	Single bath.	Course of 21 baths.
Alhambra.....	\$0.40	\$7.00	Majestic.....	\$0.50	\$9.00
Arlington.....	.55	10.00	Maurice.....	.55	10.00
Buckstaff.....	.55	10.00	Moody.....	.45	8.00
Crystal (colored).....	.25	4.00	Ozark.....	.35	6.00
Eastman.....	.55	10.00	Ozark Sanatorium.....	.40	7.00
Great Northern.....	.45	8.00	Palace.....	.40	7.00
Hale.....	.40	7.00	Park, upper floor.....	.55	10.00
Horse Shoe.....	.35	6.00	Park, lower floor.....	.50	9.00
Hot Springs.....	.45	8.00	Rector.....	.45	8.00
Imperial.....	.55	10.00	Rockafellow.....	.40	7.00
Lamar.....	.45	8.00	St. Joseph's Infirmary.....	.45	8.00
Magnesia.....	.40	7.00			

Business of bathhouses, fiscal year ended June 30, 1912.

Name of bathhouse.	Whole tickets.	Half tickets.	Quarter tickets.	Single paid baths.	Number of baths sold.	Number of baths redeemed.
Alhambra.....	1,825	1,198		2,173	50,653	7,732
Arlington.....	1,091	1,487		4,876	42,657	5,457
Buckstaff.....	938	706	404	1,840	30,618	3,484
Crystal.....	271	704		815	13,546	513
Eastman.....	421	609		1,044	15,554	3,078
Great Northern.....	205	307		1,447	9,363	1,215
Hale.....	940	879		2,720	31,963	2,822
Horse Shoe.....	1,591	1,776		939	52,110	4,213
Hot Springs.....	466	358		971	13,975	1,582
Imperial.....	462	230		594	9,498	793
Lamar.....	1,804	1,760	793	3,431	62,905	7,183
Magnesia.....	1,347	770	28	1,207	37,334	5,647
Majestic.....	1,461	1,009		1,085	41,856	6,617
Maurice.....	1,707	1,123	540	1,902	49,972	4,990
Moody.....	734	615		584	22,148	4,071
Ozark.....	3,466	2,338	1,504	4,153	107,839	12,291
Ozark Sanatorium.....	136			45	2,901	767
Palace.....	2,046	1,281		1,623	57,099	7,432
Park (upper floor).....	290	294		841	9,871	1,178
Park (lower floor).....	948	487		343	24,414	2,978
Rector.....	455	369	89	448	14,018	2,001
Rockafellow.....	1,369	969		1,303	39,642	3,655
St. Joseph's Infirmary.....	386	198			10,086	779
Total.....	24,359	19,429	3,358	34,284	750,012	90,268

Business of bathhouses, fiscal year ended June 30, 1912—Continued.

Name of bathhouse.	Net paid baths.	Compli- men- tary baths.	Amount paid for redeemed baths.	Total receipts less re- demptions.	Total expense of operation.	Net loss.	Net profit
Alhambra	42,921		\$2,244.05	\$12,612.20	\$7,465.80		\$5,146.40
Arlington	37,200		2,646.85	18,260.55	14,204.25		4,056.30
Buckstaff	27,154	42	1,732.25	13,199.75	9,085.27		4,114.48
Crystal	12,953		118.65	2,256.10	3,350.80	\$1,094.70	
Eastman	12,476		1,539.80	6,289.40	4,721.86		1,567.54
Great Northern	8,148		410.80	2,673.86	4,054.80	1,380.94	
Hale	29,331	24	874.80	9,776.25	4,506.40		5,269.85
Horse Shoe	47,897	21	1,045.00	10,654.10	5,897.05		4,757.05
Hot Springs	12,392		569.10	7,731.50	5,279.59		2,451.91
Imperial	8,700		394.40	5,359.05	3,091.05		1,067.99
Lamar	55,712	51	2,097.20	20,059.60	8,768.68		11,290.92
Magnesia	31,087	191	1,592.15	8,493.05	5,755.45		2,736.00
Majestic	35,239		2,713.30	14,598.00	7,890.76		6,707.24
Maurice	44,982	63	2,495.15	22,585.95	10,558.14		12,027.81
Moody	18,077	21	1,546.77	6,627.18	3,283.03		3,344.15
Ozark	95,548	240	2,969.15	22,102.80	6,661.40		15,451.40
Ozark Sanatorium	2,124		230.15	669.45	642.75		26.70
Palace	49,667	64	2,477.60	14,151.56	5,866.48		8,285.08
Park (upper floor)	8,693	10	557.40	4,233.10	3,211.75		921.35
Park (lower floor)	21,436	35	1,090.22	7,518.78	5,235.90		2,282.88
Rector	12,017		762.80	4,365.90	3,564.40		801.50
Rockafellow	35,987		1,218.55	11,463.60	6,750.65		4,712.95
St. Joseph's Infirmary	9,307		259.80	3,596.20	974.00		2,622.20
Total	659,648	762	32,185.94	229,277.93	131,411.27	2,475.64	100,342.90

Amount received by bath attendants for fiscal year ended June 30, 1912.

Name of bathhouse.	Total amount received.	Amount returned for redeemed tickets.	Total receipts less redemptions.
Alhambra	\$7,597.95	\$1,159.80	\$6,438.15
Arlington	6,234.90	723.05	5,511.85
Buckstaff	4,452.00	622.00	3,830.00
Crystal	1,991.25	98.00	1,893.25
Eastman	2,333.10	461.70	1,871.40
Great Northern	1,370.20	169.50	1,200.70
Hale	4,750.00	375.00	4,375.00
Horse Shoe	7,816.50	621.95	7,194.55
Hot Springs	2,101.10	237.30	1,863.80
Imperial	1,422.70	118.95	1,303.75
Lamar	9,165.15	1,078.95	8,086.20
Magnesia	5,556.90	779.70	4,777.20
Majestic	6,059.25	965.75	5,093.50
Maurice	7,495.80	748.50	6,747.30
Moody	3,320.20	610.65	2,709.55
Ozark	15,655.95	1,843.65	13,812.30
Ozark Sanatorium	303.00		303.00
Palace	8,157.00	1,114.80	7,042.20
Park (upper floor)	1,685.00	172.00	1,513.00
Park (lower floor)	2,552.60	345.95	2,206.65
Rector	2,102.70	345.15	1,802.55
Rockafellow	5,311.50	451.40	4,860.10
St. Joseph's Infirmary	1,437.30	242.80	1,194.50
Total	108,872.05	13,141.55	95,730.50

Following the readjustment of fixing of bath rates I ordered the bathhouse managers to place new signs showing the prices per course of baths, including attendants' services.

The total number of attendants employed in all the bathhouses during the year will vary approximately from 150 to 225, according to the volume of business. The total amount paid attendants for services in the bathhouses was \$95,742.50, which sum does not, of course, include tips or presents received by them.

On January 1, 1912, the new Maurice bathhouse was opened. This is a modern, fireproof building, with capacity of bathing, amid the most perfect hygienic environments, at least 650 per day. On February 1, 1912, the new Buckstaff (formerly the Rammelsburg) was opened for business, and on April 23, 1912, the new Imperial was opened. All of these buildings are new, modern in every respect, practically fireproof, with every convenience and facility for the administration of the baths in the most scientific manner, all being equipped with the very latest apparatus known to hydrotherapy. It cost approximately \$125,000 each to build and equip these new houses, and I have been informed by those of extensive travel that they are unsurpassed and but in one or two instances equaled anywhere. During the year the Great Northern bathhouse made extensive improvements, as have all of the others. Plans have been approved by the department for a new bathhouse for the Ozark Sanatorium, and preliminary work is now going on with it.

Plans are now being made for new houses to replace the Hale, the Magnesia, and the Horse Shoe, the department having granted the lessees until January 1, 1913, to complete plans for approval and to begin the work on constructing new houses. This will result in the addition of new houses the coming year, which will doubtless be followed by new houses to replace the Superior, which has been closed during the year; the Ozark, Palace, and Lamar, when these are built, will include all the houses on bathhouse row, and as the architectural designs and material required are to be harmonious, the whole when completed will form a row of bathhouses of surpassing beauty and grandeur unequalled in the world.

Hot water and ground leases.

Name of bathhouse, etc.	Lessee.	Tubs.	Date of lease.	Expiration of lease.
Alhambra.....	Alhambra Bathhouse Co.....	24	Feb. 28, 1894	Feb. 27, 1914
Arlington ¹	Arlington Hotel Co.....	66	Mar. 3, 1892	Mar. 2, 1912
Buckstaff ²	Buckstaff Bathhouse Co.....	32	Jan. 1, 1912	Dec. 31, 1931
Crystal.....	Knights of Pythias (colored).....	12	Aug. 1, 1903	July 31, 1913
Eastman ¹	New York Hotel Co.....	64	Nov. 26, 1892	May 11, 1912
Great Northern ³	Fannie C. Williamson.....	17	May 25, 1897	May 14, 1912
Hale ⁴	Roots & Eastman.....	23	Jan. 1, 1893	Dec. 31, 1907
Horseshoe ⁵	D. Fellows Platt.....	30	Jan. 1, 1895	Dec. 31, 1909
Hot Springs.....	C. H. V. and G. M. Smith.....	16	Jan. 1, 1903	Dec. 31, 1912
Imperial ⁶	Chas. N. Rix.....	28	Jan. 1, 1912	Dec. 31, 1931
Lamar.....	M. C. Tomblor and G. H. Buckstaff..	30	Jan. 1, 1897	Dec. 31, 1916
Magnesia ⁷	Chas. B. Platt.....	30	Jan. 1, 1895	Dec. 31, 1909
Majestic.....	Avenue Hotel Co.....	20	Jan. 1, 1903	Dec. 31, 1913
Maurice ⁸	Maurice Bath Co.....	30	Jan. 1, 1912	Dec. 31, 1931
Moody ¹	Nicholas M. Moody.....	14	July 1, 1900	June 30, 1910
Ozark.....	F. P. Sorrells and F. B. Latta.....	26	Jan. 1, 1904	Dec. 31, 1913
Ozark Sanatorium ¹	Ozark Sanatorium Co.....	10	Sept. 16, 1906	Sept. 16, 1912
Palace.....	Samuel W. Fordyce.....	23	Jan. 1, 1907	Dec. 31, 1921
Park ¹	Garland Hotel Co.....	46	May 12, 1892	May 11, 1912
Rector.....	Elias W. Rector.....	12	Apr. 16, 1904	Apr. 15, 1914
Rockafellow.....	Mahala J. Rockafellow.....	18	July 1, 1901	June 30, 1916
St. Joseph's Infirmary ¹	Sister Superior Mary Francis.....	10	Feb. 1, 1904	Jan. 31, 1914
Superior ²	Robert Proctor and R. A. Simpson....	16	Sept. 15, 1896	Sept. 14, 1906
Waverly ³	New Waverly Hotel Co.....	20	Mar. 24, 1893	Mar. 23, 1913
Horse Pool ⁴	Simon Cooper.....	2	Jan. 7, 1908	Oct. 29, 1912
Arlington Hotel, ground lease.	Arlington Hotel Co.....	.....	June 3, 1912	Sept. 2, 1912
Ground lease.....	Hot Springs Mountain Observatory Co.	.....	Oct. 16, 1903	Aug. 31, 1913

¹ Water used in private bathrooms in portion of tubs leased.

² Tenants holding over.

³ Rebuilt and reopened Feb. 1, 1912.

⁴ Rebuilt and reopened Apr. 23, 1912.

⁵ Rebuilt and reopened Jan. 1, 1912.

⁶ Closed Mar. 31, 1911.

⁷ Destroyed by fire Jan. 28, 1910.

⁸ Water sufficient to supply two tubs.

DRUMMING.

The situation regarding what was once the worst evil existing here, that of drumming on trains to hotels, boarding houses, rooming houses, and physicians, is a thing of the past. The system of train inspection has completely eliminated the evil on the trains. Drummers never work the trains now, and since the most rigid rules affecting the registration of physicians are enforced the physicians registered are extremely cautious not to violate the Government rules, because they know that any infraction now which might result in the removal of their names from the registered list means a long, tedious wait, and perhaps never being restored to the list or permitted to ever prescribe the waters. I believe doctor drumming has been effectively stopped. There may be an occasional isolated case in which some patient may be used to steer others to a doctor, but by constant investigation we have reduced the evil to the very lowest possible minimum, so that whereas it used to be openly and flagrantly done, with the accompanying bad results, now if it is practiced it is done so stealthily that the best efforts of the Government can hardly discover it. I keep now a monthly list of all patients each physician treats for the month, and those physicians who were once engaged in the practice of drumming are under constant inspection and investigation, which results in their being extremely careful not to violate the rules.

So many complaints have been made of inattention to and disregard of the physicians' directions on the part of bath attendants that I found it necessary to issue an order that the name of the attendant be inscribed on the back of permits for baths as well as the physicians' directions. This method will enable this office to place the blame of such derelictions where it properly belongs. Attendants, if capable of reading, should have no difficulty in carrying out bath directions, as the duration of the bath and the right temperature which is specifically prescribed by the doctor, is all that is required, and unless such is carried out there is room for complaint. I look for this condition to improve now that no question can arise as to the one guilty of failure to carry out instructions. However, when the great numbers of ill and afflicted who bathe is taken into consideration it is not unreasonable to expect all sorts of complaints, and the installation of every system calculated to correct and improve conditions is all one can be expected to do.

A feature of hotel drumming which has within the last year grown very obnoxious is that now practiced at the railroad stations and on the streets of the city. There is a statute in the laws of Arkansas prohibiting hotel drumming or soliciting on the platforms and at stations; also a city ordinance here licensing hotel owners only to so drum at stations, and absolutely prohibiting all drumming on the streets. This ordinance is not enforced, and the way travelers are harassed and worried on the streets is the worst class of drumming; and unless the city will enforce its laws the department should amend rule 5 so as to include street, station, or any other place where such drumming is in violation of existing laws, either State or municipal. Sick visitors should in all cases be protected and not be forced to suffer such annoyances.

IMPROVEMENTS.

During the year the following improvements were made on the reservation:

There was constructed, on East Mountain, 2,430 linear feet of retaining wall of an average height of $3\frac{1}{2}$ feet and average thickness of 2 feet.

On West Mountain there was constructed 2,782 linear feet of retaining walls, together with gutter, the walls being an average of 3 feet high and 2 feet thick.

The greenhouses were thoroughly overhauled and new heating plant installed, and the brick wall on the east side removed and supplanted by glass windows, affording sufficient light and heat for not only preserving the plants but at the same time providing a propagating house.

Laid 36 feet of 18-inch tiling on West Mountain to protect block No. 114.

Constructed 135 linear feet of retaining wall, $3\frac{1}{2}$ feet high and 2 feet thick, in front of blocks 188 and 189, as well as laid concrete sidewalk, 6 feet wide, and concrete curb, 6 inches thick and 20 inches deep, in front of same blocks, and changed wall and further protected the Whittington cold spring on which the same was placed.

Laid new sidewalk and retaining wall in the rear of the Maurice bathhouse.

Laid 800 feet of $1\frac{1}{2}$ -inch new galvanized-iron pipe line on bathhouse row to replace wornout line connected with city waterworks.

Set all posts in cement and completed 77 panels of galvanized-pipe fence to protect the serpentine road up West Mountain leading off from Central Avenue. This is a very sightly and substantial improvement, which was much needed.

Built complete four comfort stations (frame), two on East Mountain, one each on North and West Mountains. These are very nice structures and were badly needed.

Laid 500 feet of 18 and 24 inch drain tile in Whittington Lake Park to carry the surface drainage into the creek.

The small cold spring on Fountain Street, which had heretofore emptied near the curb across the street opposite the pavilion, was brought to the Government side of the street and a nice stone bowl placed for it next to the pavilion. This spring was named "Col. Hamblin Spring" and a sign put over it in honor of the second superintendent of the reservation. The large spring in the pavilion was inclosed and named, with suitable sign, "Gen. Kelley," in honor of the first superintendent of the reservation.

Painted and distributed on mountains 160 benches.

Painted fence around Whittington Lake Park.

Put new wooden jacket, new roof, and painted complete the hot-water tank in rear of public bathhouse.

Hauled and distributed on roads of East and West Mountains 425 yards of cement gravel. Constant work has been done all during the year on the mountain roads, paths, etc. It is a very difficult problem to keep these roads up because of the heavy rains, which wash considerable and demand constant repair, but I can say all the roads are in exceptional fine condition.

The greater portion of East Mountain, especially next to bathhouse row, is kept clean and the grass cut at all times; the many flower beds and all shrubbery have been well cared for during the year and were never more luxuriant or beautiful.

A substantial and slightly concrete walk has been laid between the Ozark and Buckstaff bathhouses, beginning at the walk in front of bathhouse row and running easterly to intersect the roadway in rear of bathhouses, thus making an attractive entrance for pedestrians to Reserve Park. This walk contains approximately 1,200 square feet.

WHITTINGTON LAKE PARK.

One hundred and twelve feet of creek walls, $1\frac{1}{2}$ feet high and 1 foot thick, were built of concrete; 2,066 linear feet of creek walls, 1 foot thick and averaging 4 feet high, were built of concrete in this park.

It was necessary after building these walls to fill in behind them. This took 265 loads of dirt, which was hauled and packed in by the regular force.

I had hauled and distributed to make the necessary fill in lower Whittington Park Lake 1,122 yards of earth. This brings the park up to near the top of the creek wall and adds very much to its appearance. Some more earth will be necessary to complete this work as that placed has settled, so that to get the park uniform more earth will be needed to bring the level up as it should be.

GOVERNMENT BATHHOUSE.

The act of Congress approved December 16, 1878, provides:

That the superintendent shall provide and maintain a sufficient number of free baths for the use of the indigent, and the expense thereof shall be defrayed out of the rentals hereinbefore provided for.

The Government bathhouse is now in charge of and under the supervision of the medical director, who will include it in his annual report. I will, in addition to giving a table showing the baths given during the year, renew my former recommendation that an appropriation be made by Congress, at as early a date as possible, for a new bathhouse. The wear and tear of the present house for the 20 years it has been in use has brought it to a condition now demanding either a new house or very extensive and expensive improvements. Allotments have already been made for some improvements which are urgently needed, which will put the house in fairly good condition and enable us to operate it for another year.

From the numerous complaints made during all the time I have been here I am more than ever of the opinion that some system should be devised whereby the different diseases can be examined and segregated in the baths. As it is now bathers afflicted with all kinds of diseases have the privilege of bathing wherever they choose, with the result that complaints are of frequent occurrence. These indigents are entitled to due consideration and should be protected as in private bathhouses as far as is practicable. This matter has heretofore been the subject of correspondence with the department and I trust it will receive due consideration.

The following table shows the result of the operation of the free bathhouse for the fiscal year ended June 30, 1912:

Baths given by free bathhouse.

Number of applications for free baths.....	7, 281
Number of applications for free baths refused.....	760
Number of tickets issued on original application.....	6, 521
Number of tickets reissued on original application.....	5, 958
Total number of baths given white males.....	101, 804
Total number of baths given white females.....	16, 510
Total number of baths given colored males.....	28, 062
Total number of baths given colored females.....	11, 288
Total number of baths given during year.....	157, 664
Average number of persons bathed daily.....	517
Number of soldiers and sailors bathed.....	407

From the above table it would be observed that the total number of baths given during the year was 157,664, whereas the total number of baths given last year was 220,435, and for the year ending June 30, 1910, was 200,048. It is unquestionably true that for many years the opinion has prevailed here that better results followed bathing in the large pools built somewhat on the order of the old Roman baths. There are 13 of these large pools in the public bathhouse, and it is quite true that many cures have been effected there which seem little less than marvelous, so that no one who is familiar with the properties of the water and its effect can deny that the greater the volume of water the greater is the volume of radio gas, and many persons have for years availed themselves of the baths at the public bathhouse who were amply able to pay for them at private bathhouses, and as the capacity of the public bathhouse was being greatly overreached to the detriment and injury of those who were really and truly indigent, I recommended that Congress pass an act requiring applicants to make a statement under oath as to their financial condition. The act was approved March 2, 1911, and is as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That only persons who are without and unable to obtain the means to pay for baths and are suffering from ailments for which bathing in the water of the Hot Springs Reservation will afford relief or effect a cure shall be permitted to bathe at the free bathhouse on the public reservation at Hot Springs, Arkansas, and before any person shall be permitted to bathe at the free bathhouse on the reservation he shall be required to make oath before such officer duly authorized to administer oaths for general purposes as the superintendent of the Hot Springs Reservation shall designate, that he is without and unable to obtain the means to pay for baths, and any person desiring to bathe at the free bathhouse on the Hot Springs Reservation making a false oath as to his financial condition shall be deemed guilty of a misdemeanor and upon conviction thereof shall be subject to a fine of not to exceed twenty-five dollars, or thirty days' imprisonment, or both.

The result speaks for itself, as there were given during the year some 63,000 baths less than the year before and 43,000 less than the year ended June 30, 1910. I see no reason why, with this additional restriction, every care and comfort surrounding the baths should not be afforded the indigent bather.

RECEIPTS AND DISBURSEMENTS.

The receipts and disbursements during the fiscal year ended June 30, 1912, were as follows:

Receipts and disbursements, revenue fund.

RECEIPTS.

Balance Hot Springs revenue fund, July 1, 1911.....	\$17,039.99
Receipts for fiscal year ended June 30, 1912:	
Water rents.....	\$80,135.00
Ground rents.....	5,100.00
Bath attendants' badges.....	44.18
Total receipts.....	35,279.16
Grand total.....	52,319.15

DISBURSEMENTS.

Salaries for July, 1911.....	\$2,356.66
Improvements, repairs, incidentals, and miscellaneous supplies.....	550.32
Expended by the superintendent.....	\$2,906.98
Expended by the department.....	360.98
Total disbursements.....	3,267.96
Disallowances by Treasury Department on superintendent's disbursements for year 1911.....	30.02
	3,237.94
Balance in United States Treasury June 30, 1911.....	49,081.21
Grand total.....	52,319.15

Receipts and disbursements, special fund sale of lots.

RECEIPTS.

Proceeds, sale of lots, special fund.....	\$82,518.00
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DISBURSEMENTS.

Salaries from August 1, 1911, to June 30, 1912.....	\$27,965.66
Improvements, repairs, incidentals, and miscellaneous supplies.....	11,968.88
Expended by the superintendent.....	\$39,934.54
Expended by the department.....	3,022.64
Total disbursements.....	42,957.18
Balances June 30, 1912:	
In the United States Treasury.....	\$38,082.83
Assistant treasurer United States, St. Louis.....	1,158.48
Cash in hands of disbursing officer, Department of the Interior.....	319.51
Available balance July 1, 1912.....	39,560.82
Grand total.....	82,518.00

OFFICIAL VISITS.

During the year this reservation was honored by official visits of inspection by Clement S. Ucker, chief clerk of the Interior Department, and W. B. Acker, assistant attorney. I can not speak too highly of the vast and incalculable benefit resulting from these visits. Nothing is more needed in the proper administration of departmental affairs than an intimate knowledge of surrounding conditions, and all citizens here commend the actions of these departmental representatives and more than appreciate the efforts of the department in its promulgating rules and regulations which have proven so universally beneficial. The old Hot Springs of the days of squatter's sovereignty, unsavory reputation, and doctor drumming has disappeared and in its stead there is a community of intelligent, clean, conscientious citizenship, working in accord and unity with the Government in all that means a properly conducted health and pleasure resort; a place where dishonest practices do not exist, but where the visitor can and does receive more for his expenditures than at any other similar resort. Hot Springs has no equal, either in curative waters, climate, mountain surroundings, or anything which adds to material comfort and happiness while one is engaged in rest, recreation, and the restoration of health. The department has done much for Hot Springs, and Hot Springs is now, through a due sense of civic pride and decency, doing much for itself. A resort so closely allied with the Government should be the acme of civic decency, law enforcement, progress, and municipal purity. These official visits are such manifestations of encouragement on behalf of the department as bring forth and stimulate better understandings and more hearty and cordial cooperation of the citizens with the department.

RECOMMENDATIONS.

I recommend as soon as it is deemed practicable that a road leading from North Mountain to Park Avenue be constructed. I have had a preliminary line run, and estimate that it will cost approximately \$5,000. That such a road is badly needed can not be questioned, and I am informed that it would have been built when the other mountain roads were constructed but for lack of funds; this should now receive due consideration. I deem the substitution of a new and larger fountain to replace the John W. Noble fountain very necessary. The John W. Noble fountain could be placed on one side of the grand entrance and another similar purchased, which would add very much to the appearance of the reservation front. I believe a colonnade should be constructed from the curb line on bathhouse row back to and including the Maurice spring, also that a colonnade or peristyle should be erected the entire length and width of the sidewalk along bathhouse row. I renew my former recommendation that a suitable conduit for water-pipe lines be provided along bathhouse row, and one from the reservoir in the rear of the superintendent's office to Reserve Avenue to care for the various pipe lines. As it is now, whenever trouble necessitates replacing a line the lawn has to be torn up, and this makes it very difficult to maintain anything like order on the front. I see no reason why the present creek arch could not be utilized as such conduit along bathhouse row; if

this is deemed practicable it would be a great saving in many ways. A new concrete walk along bathhouse row is badly needed and will very soon have to be rebuilt. Some provision for comfort stations, one at least, should be made on bathhouse row. I have had the creek arch inspected and can report it in good condition at the present time.

EMPLOYEES.

There are 32 employees, including the superintendent, required to properly maintain and care for the reservation interests. Their names, duties, and compensations, together with the names of the States from which they were appointed, are shown in the following table:

Reservation employees.

Harry H. Myers, superintendent, appointed from Arkansas.....	\$3, 600
B. Frank Bayley, chief clerk and assistant to superintendent, appointed from Arkansas.....	1, 680
Noble J. Wilt, clerk-stenographer, appointed from Illinois.....	1, 200
Maj. Harry M. Hallock, medical director, appointed from Vermont.....	4, 400
J. H. Demby, manager of free bathhouse, appointed from Arkansas (duties are to have general charge of the free bathhouse, receive applications for free baths, collect tickets, and see that the rules and regulations are carried out, together with such instructions as he may from time to time receive from constituted authority).....	1, 080
Richard L. Lawrence, head male attendant at free bathhouse, appointed from Arkansas (duties are to have charge of bathtubs, pools, dressing rooms, etc., and see that the same are kept clean; also to have charge of heating plant, electric motor, and pump which furnishes water supply, and to act as manager during the absence of the latter).....	840
Martin Winn, male attendant at free bathhouse, appointed from Arkansas (duties are to have charge of the white men's bathing department and to keep the tubs, pools, and dressing rooms clean and sanitary).....	600
Samuel Clark, male attendant at free bathhouse, appointed from Arkansas (duties are to have charge of the colored men's bathing department and to keep the tubs, pools, and dressing rooms clean and sanitary).....	600
Van Cannon, male attendant at free bathhouse, appointed from Arkansas (duties same as other attendants).....	600
William Clark, male attendant free bathhouse, appointed from Arkansas (duties same as other attendants).....	600
William C. Turner, male attendant free bathhouse, appointed from Arkansas (duties same as other attendants).....	600
Mary Clark, female attendant at free bathhouse, appointed from Arkansas (duties are to have charge of the white women's bathing department and to keep the tubs and dressing rooms clean and sanitary).....	480
Mattie Fielding, female attendant at free bathhouse, appointed from Arkansas (duties are to have charge of the colored women's bathing department and to keep the tubs and dressing rooms clean and sanitary).....	480
Susie Fielding, female attendant at free bathhouse, appointed from Arkansas (duties same as other attendants).....	480
Jonathan A. Jordan, supervisor on the reservation, appointed from Arkansas (duties are to have charge of the distribution of the hot water and see that each bathhouse gets the amount allotted to it, and to act as foreman of foresters and gardeners).....	1, 200
Edward Wheelock, policeman, appointed from Arkansas (detailed as train inspector on the Rock Island R. R. to ride all passenger trains entering the city and making an oral statement or speech in each coach giving visitors information generally before their arrival), per month.....	90
Hiram N. Anderson, policeman, appointed from Arkansas (detailed as train inspector same as above, on the Iron Mountain R. R.), per month.....	90

Reservation employees—Continued.

Montgomery Prichard, policeman, appointed from Arkansas (duties are to have general supervision over all Government property and to see that no stock or persons commit depredations on the reservation, observe and report all violations of department rules and regulations, give general information to strangers concerning the reservation, and make arrests when necessity requires)-----	\$840
Richard L. Gaffney, mounted police for night duty, appointed from Arkansas-----	960
John W. St. Clair, policeman, appointed from Arkansas (duties same as other policemen, but at present detailed in superintendent's office to issue bath permits)-----	840
Patrick J. Dugan, forester and gardener, appointed from Arkansas (duties are to cultivate and care for shrubbery and flowers, keep up roads, drives, and walks, and make and maintain other improvements on the reservation, under direction of the superintendent)-----	600
Peter Nelson, forester and gardener, appointed from Arkansas (duties same as other foresters and gardeners)-----	600
William F. Jennings, forester and gardener, appointed from Arkansas (duties same as other foresters and gardeners)-----	600
Philander H. Bump, forester and gardener, appointed from Arkansas (duties same as other foresters and gardeners)-----	600
Jap George, forester and gardener, appointed from Arkansas (duties same as other foresters and gardeners)-----	600
Bishop H. Borrough, forester and gardener, appointed from Arkansas (duties same as other foresters and gardeners)-----	600
Hiram Walters, forester and gardener, appointed from Arkansas (duties same as other foresters and gardeners)-----	600
George W. Withrow, forester and gardener, appointed from Arkansas (duties same as other foresters and gardeners)-----	600
Robert L. Stutta, laborer, appointed from Arkansas (duties are to sweep and keep clean the concrete walk in front of bathhouse row, and to remove all trash on the front from grounds not cared for by the bathhouse lessees)-----	600
James Daniels, laborer, appointed from Arkansas (duties are janitor at the office building and messenger for the superintendent)-----	600
Oliver H. Hoskins, laborer, appointed from Arkansas (duties are to care for the horses and vehicles in stables, act as driver for the superintendent when necessary, and perform such other duties as may be required)-----	600
Abraham Logan, laborer, appointed from Arkansas (duties are janitor at the office building and messenger and driver for the medical director)-----	600

CITY OF HOT SPRINGS.

Hot Springs is a city of about 16,000 resident population, with churches of all denominations, public and private schools, a fine street railway system, waterworks, electric and gas lights, well-equipped fire department, local and long-distance telephone systems, metropolitan police system, fine city auditorium, and a magnificent race track and State fairgrounds. There are about 600 hotels and boarding houses, which furnish all grades of accommodations for visitors. A fine tennis court in Whittington Lake Park Reservation is always open to the public, as is also a splendid 18-hole golf-link course and country club. Hot Springs is reached by two trunk lines—St. Louis, Iron Mountain & Southern and the Rock Island system.

In conclusion, I indulge the hope that the results accomplished in the administration of the affairs of this reservation during the past year will prove a source of gratification to the department, as I am

sure they have to the public. The cordial interest in the advancement of every idea tending to afford a greater degree of relief to a visiting public and the more hearty cooperation of the citizens with this department, as has been manifested in numerous ways during the year; the general improved tone of business and the assurance of a greater hope for the future, taken in connection with the more scientific and efficient administration of these wonderful waters, augur a solid and substantial growth and splendid future, and indicate beyond question that so long as the visitor receives the very best treatment amid climatic conditions rare equaled and unsurpassed, with waters as marvelous in curative properties as they are mysterious in their source, that Hot Springs may well be termed the "World's pleasure ground and health sanatorium."

I have the honor to be, very respectfully,

HARRY H. MEYERS,
Superintendent.

THE SECRETARY OF THE INTERIOR.

APPENDIX.

RULES AND REGULATIONS, WITH ALL AMENDMENTS THERETO, UP TO AND INCLUDING JUNE 30, 1912, FOR THE GOVERNMENT OF ALL BATHHOUSES RECEIVING HOT WATER FROM THE UNITED STATES RESERVATION AT HOT SPRINGS, ARK.

The superintendent of the Hot Springs Reservation is directed to enforce a prompt and faithful compliance with the following rules:

RULE 1.—Bathhouses or hotels will be allowed such number of tubs as the Secretary of the Interior may, in his discretion, deem proper and necessary for the public service and the amount of hot water will justify.

RULE 2.—The constant flow of hot water for vapor or other baths, even during business hours, or the unnecessary waste of water in any manner, is strictly prohibited, and will, if continued after written notice from the superintendent to stop such waste of water, be considered by the department sufficient grounds for the cancellation of the lease of such offending lessee.

RULE 3.—Rentals must be paid quarterly, in advance, at the office of the superintendent, and if not paid within five days from the beginning of each quarter the supply of water may be cut off.

RULE 4.—The charge for baths at the different bathhouses shall be at the rates fixed by the Secretary of the Interior, and no bath tickets shall be sold for more than said rate, and then only to such persons as intend to actually use them for bathing. The rate or rates so fixed for baths shall include, without extra charge, the supplying of each bather with one clean sterilized sheet to envelop the body of the bather while in the bath hall and cooling room. In event of charges in a less amount being exacted for baths, such new rate shall at once be reported to the superintendent, and, when approved by the department, shall thereafter become the maximum rate. No bath ticket shall be sold except at the office of the bathhouse where the bath is to be given, and tickets must show the date when issued, the serial number, the number of baths for which issued, the full name of the purchaser, and the amount paid therefor. Bath tickets shall be redeemable for the same proportionate price for which they were sold, when presented by the original purchaser: *Provided, That* when less than seven baths have been taken on any ticket presented for redemption the bathhouse may charge the rate for single baths for the number of baths taken on said ticket. No bath ticket or part of a ticket shall be reissued after having been redeemed. No bathhouse receiving water from the Hot Springs Reservation will be permitted to issue complimentary bath tickets, except that bathhouse lessees may, on written permission of the superintendent, issue complimentary bath tickets in such cases as in his judgment justify such action. The renting and selling of bath robes, towels, soap, toilet articles, or articles of merchandise in bathhouses is prohibited.

RULE 5.—The owners or managers of bathhouses receiving waters from the Hot Springs Reservation are prohibited from bathing in said bathhouses persons stopping at any hotel, boarding house, or rooming house which has a drummer or solicitor on trains or the owner of which drums or solicits on trains, or who has employed in or about such house any inside man or person engaged in drumming or soliciting business for doctors or bathhouses; also the owners or managers and the employees of such bathhouses are absolutely prohibited from either directly or indirectly reflecting on or questioning the integrity of the hot-water supply of any other bathhouse, or of claiming superiority of its own supply of hot water over that furnished from the springs on the reservation to other bathhouses. Upon evidence of violation of this rule the superintendent shall report the facts, with his recommendation, to the Secretary of the Interior, looking to the shutting off of the water from any bathhouse or canceling the lease, as the department may determine.

RULE 6.—Owners and managers of bathhouses receiving waters from the Hot Springs Reservation will provide in their respective bathhouses the requisite number of head bath attendants, who, under the supervision and direction of the medical director of the Hot Springs, shall supervise the administration of baths, the treatment of patients, matters of hygiene and sanitation in the bathhouses, and the work of bath attendants generally. Bathhouse attendants shall be allowed to charge for their services not exceeding 15 cents for a single bath, \$1 per week, or \$3 per course of 21 baths, to be collected for the attendant by the bathhouse manager and properly accounted for by him to the attendant. The duties of the attendants shall consist in the administration of the baths in strict accordance with the bathing directions of registered physicians and in lieu of these as ordered by the medical director. They shall be required to clean and care for such parts of the bathhouse as may be assigned them by the manager, subject to the approval of the medical director, to keep themselves in a neat and cleanly condition both in person and in dress, and to make good any damages accruing from breakage or neglect of duty. They shall not be required to handle helpless individuals, rub mercury, furnish mops, brooms, or cleaning materials, furnish or launder towels, mitts, sheets, or robes; pay for the services of the porter or perform work which properly belongs to him, or incur any expense whatsoever incident to the operation of the house not specifically authorized. It shall be optional with the bather whether he employ an attendant or not. No person shall be employed or permitted to serve or occupy space in any bathhouse as a mercury rubber or as a masseur without the approval of the medical director first had and obtained; and every person so employed or serving shall be subject and amenable to the rules and regulations the same as attendants and other bathhouse employees.

RULE 7.—The payment of any sum of money or anything of value, either directly or indirectly, by any bathhouse owner, manager, clerk, or attendant as compensation for drumming customers to any bathhouse, or allowing public drummers, drumming doctors, hotel or boarding-house proprietors who are drummers, or persons who work with them as inside men, to bring persons or show them through, or

to loiter in or about any bathhouse, is positively forbidden. Upon evidence of violation of this rule, the superintendent shall report the facts, with his recommendation, to the Secretary of the Interior, looking to the shutting off of the water from any bathhouse or canceling the lease, as the department may determine.

RULE 8.—The lessee of each bathhouse shall cause to be kept a full and correct daily register of each bath given, the number and kind of bath tickets sold, and the number of complimentary tickets, if any, issued each day, etc., such form of register to be approved by the superintendent and a copy therefrom of each day's business to be forwarded to the superintendent daily. No person shall be allowed to bathe without a numbered ticket being issued and a record of the same being kept, and report thereof duly certified by the manager filed with the superintendent on the first day of each month as paid, complimentary, or free baths, together with any information he may have showing a violation of the bathhouse rules and regulations which may be susceptible of proof.

RULE 9.—All bathhouses receiving deposits of jewelry, money, or other valuables from bathers must provide means satisfactory to the superintendent of the reservation for the safe-keeping thereof; it is to be understood, however, that the Government assumes no responsibility in the premises. All losses must be promptly reported to the superintendent by the bathhouse manager.

RULE 10.—An applicant for baths who is under medical treatment shall not be permitted to bathe in any bathhouse supplied with hot water from the Hot Springs Reservation, unless said applicant presents satisfactory evidence that he or she is the patient of a physician who is duly registered at the office of the superintendent as qualified to prescribe the waters of the hot springs, and who is known not to engage in drumming for custom: *Provided*, That every applicant for baths, not under the care of a registered physician, shall be required to make a certificate to be filed with the bathhouse manager that he or she is not under the care of any physician, and should such applicant subsequently employ, consult, or take treatment from any physician while taking baths, then in such case he or she will immediately notify the bathhouse manager of such fact. The violation of this rule by the owner, manager, or any employee of a bathhouse receiving hot water from the reservation will result in the cutting off of the water from the bathhouse or the canceling of the lease, as the department may determine.

RULE 11.—Physicians desiring to prescribe the waters of the hot springs, either internally or through the medium of baths, must first be registered at the office of the superintendent of the reservation, and shall use only such uniform form of bathing directions as meet with the approval of the superintendent. Registration will be accorded only to such physicians as are found, by a board designated by the Secretary of the Interior, to have proper professional qualifications and character and who do not engage in drumming for custom. No physician who shall engage in the solicitation of patronage through the medium of drummers or otherwise, or who shall engage in unprofessional, disreputable, or dishonest conduct, or is addicted to the drug or other habit which disqualifies him for the performance of his professional duties, shall be or remain registered. In case any per-

son who, in violation of these regulations, bathes or attempts to bathe, or enters or attempts to enter upon the Hot Springs Reservation to bathe, shall have the permit of a physician therefor, such physician shall be liable to the penalties provided in the act of April 20, 1904, unless he is regularly registered, but the bather or the person attempting to bathe shall not be liable to the penalties of said act unless it shall be made to appear that he knew or had reason to believe that the physician giving him the permit to bathe was not regularly registered. The management of any bathhouse will not be allowed to permit persons not under treatment by registered physicians to bathe unless they present tickets from the superintendent of the Hot Springs Reservation authorizing the holders thereof to use the hot waters. The names, number and street where stopping in Hot Springs, and the home addresses of the holders of such tickets must be registered in the office of the superintendent and by the management of the bathhouse, and on or before 12 o'clock a. m. of the day next succeeding the one on which the tickets were used the management of the bathhouses must return all such tickets to the superintendent.

RULE 12.—If a charge is made to the superintendent in writing, under oath, supported by the affidavits of two or more witnesses, that a registered physician has violated any of the laws or regulations pertaining to the government of the bathhouses receiving hot water from said reservation, the registered physician against whom the charge is made shall be immediately notified by the superintendent of the fact that affidavits have been made and be accorded an opportunity to cross-examine the witnesses on the subject thereof, in the presence of the superintendent, and the affidavits so filed, with the answers to such interrogatories as may be propounded by the physician, when completed, shall be duly certified by the superintendent and turned over to the Federal registration board, and thereafter, if in the judgment of the board the facts warrant such action, they will immediately cite the physician to appear before such board on a day to be named, within not exceeding 10 days from date of notice, to show cause why his name should not be stricken from the register of physicians authorized to prescribe the hot waters of said springs, and pending the investigation and final action upon such charges the right of such physician to prescribe the hot waters may be suspended by the Federal registration board, with the approval of the Secretary. The physician against whom such complaint is made shall have the right to file further written interrogatories pertinent to the issue to such complainants or witnesses, to be answered by them under oath, and may submit within 20 days thereafter counter affidavits in answer to the charges made in the affidavits of said witnesses.

The complainant witnesses may file rebuttal affidavits within 10 days after the service upon them of said counter affidavits, and the hearing of said charges shall be had on the record aforesaid. An appeal from the decision of said board and upon said record may be taken within seven days from such decision to the Secretary of the Interior.

If upon consideration of the complaint the charge is not sustained, the suspension will be immediately removed. If, however, such

charge is sustained, or if default be made, the name of the physician shall be stricken from the registered list.

RULE 13.—Persons violating any of the foregoing regulations within the purview of the act of April 20, 1904, entitled "An act conferring jurisdiction upon United States commissioners over offenses committed in a portion of the permanent Hot Springs Mountain Reservation, Arkansas," and the act of March 2, 1907, amendatory thereof, will be deemed guilty of a misdemeanor, and be subjected on conviction to the payment of a fine, as provided in said act of April 20, 1904, of not exceeding \$100, and be adjudged to pay all costs of the proceeding.

RULE 14.—All bathhouses shall be kept in a neat, clean, and sanitary condition, and all sewage and waste water properly conducted away, and all underdrainage kept in perfect order. The water-closets shall have sufficient and free connection with the public sewers and be kept in the best order and with the best plumbing furnishings and appliances. Lessees of bathhouses on the permanent reservation shall, under the direction of the superintendent, cultivate and maintain a part of the bathhouse park in front of their respective bathhouses, the space for each to cultivate to be allotted by the superintendent.

RULE 15.—Each bathhouse manager, clerk, and attendant shall be required to have a full and complete understanding of the Bathhouse Rules and Regulations before entering upon his duties.

The superintendent is authorized to require the discharge of any bathhouse manager, clerk, attendant, mercury rubber, or masseur for bathhouse drumming or refusing or neglecting to carry out the Bathhouse Rules and Regulations according to the true intent and meaning thereof. Any person discharged for cause from a bathhouse or removed at the request of the superintendent shall not be again employed by the same or any other bathhouse or permitted to render service in any bathhouse without the written consent of the superintendent. Managers must promptly report to the superintendent the name of any person so removed.

A neatly framed copy of the rules and regulations now in force, together with the prices of baths and attendant's fees, both separately and combined, printed in large black type on white cardboard, shall be conspicuously posted in the office of each bathhouse.

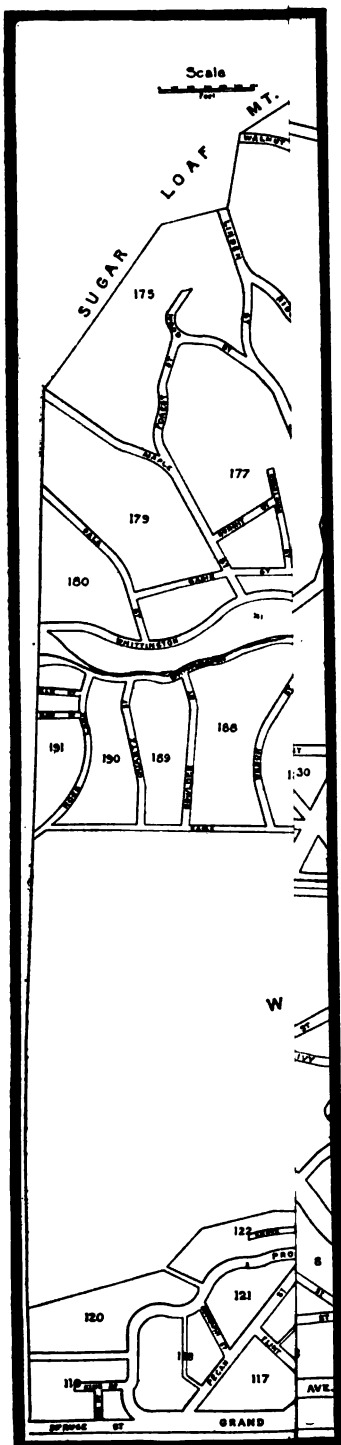
An act authorizing the Leo N. Levi Memorial Hospital Association to occupy and construct buildings for the use of the corporation on lots numbered three and four, block numbered one hundred and fourteen, in the city of Hot Springs, Arkansas.—Approved, June 3, 1912.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the exclusive right to use, occupy, and enjoy the possession of all of lots numbered three and four, in block numbered one hundred and fourteen, in the city of Hot Springs, Arkansas, is by this act granted to the Leo N. Levi Memorial Hospital Association, a corporation organized under the laws of the State of Arkansas, for the purpose of erecting and maintaining thereon a suitable and sightly building for the use of the said corporation. The rights and privileges granted under this act

shall continue as long as the property is used and occupied for the purposes mentioned in this act, subject, however, to the following conditions and limitations, namely, that unless said Leo N. Levi Memorial Hospital Association shall within five years after the passage of this act erect and equip a suitable and sightly building for the purposes above mentioned, or if said Leo N. Levi Memorial Hospital Association shall at any time hereafter use or permit the premises to be used for any other purpose than that herein granted, then and in either event all the rights, privileges, and powers by this act granted and conferred upon said association shall be forfeited to the United States.

SEC. 2. That upon compliance with the conditions and requirements of section one of this act by said corporation the Secretary of the Interior, in his discretion, is hereby authorized to lease the said association a sufficient quantity of hot water to accommodate said association for all drinking purposes, and to supply not more than five bathtubs, under such rules and regulations as he may prescribe; and all improvements made upon said property shall be subject to the approval of the Secretary of the Interior.

SEC. 3. That the right to alter, amend, or repeal this act is hereby expressly reserved.



[The numbers in this list refer to the smaller numbers on the map; the larger numbers on the map are the numbers of the squares.]

1. Superintendent's office.
 2. Lamar bathhouse.
 3. Buckstaff baths.
 4. Ozark bathhouse.
 5. Magnesia bathhouse.
 6. Horse Shoe bathhouse.
 7. Palace bathhouse.
 8. Maurice bathhouse.
 9. Hale bathhouse.
 10. Superior bathhouse.
 11. Arlington Hotel and baths.
 12. Government free bathhouse.
 13. Imperial bathhouse.
 14. Hot Springs bathhouse and hotel.
 15. Rector bathhouse and Waukesha Hotel.
 16. Rockafellow bathhouse and hotel.
 17. Majestic Hotel and baths.
 18. St. Joseph Infirmary.
 19. Great Northern Hotel and baths.
 20. Post office.
 21. Business Men's League.
 22. Rock Island Station.
 23. Iron Mountain Station.
 24. Ozark Sanitorium.
 25. Alhambra bathhouse.
 26. Moody Hotel and baths.
 27. City Hall and Auditorium Theater.
 28. ——— Electric street car lines.
 29. Main entrance to reservation.
 30. Park Hotel and baths.
 31. Eastman Hotel and baths.
 32. Arkansas National Bank.
 33. Security Bank.
 34. Citizens National Bank.
 35. Elks' Home and Masonic Temple.
 36. First Baptist Church.
 37. First Methodist Church.
 38. Episcopal Church.
 39. Catholic Church.
 40. First Presbyterian Church.
 41. Whittington Lake Park.
 42. High-school building.
 43. County courthouse.
 44. Superintendent's official residence.
- North, West, and Hot Springs Mountains and Whittington Lake Park form the permanent Hot Springs Reservation, owned and operated by the Government.

**REPORT OF THE MEDICAL DIRECTOR OF THE
HOT SPRINGS RESERVATION.**

827

REPORT OF THE MEDICAL DIRECTOR OF THE HOT SPRINGS RESERVATION, ARK.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., August 23, 1912.

SIR: I have the honor respectfully to submit the following annual report for the fiscal year ended June 30, 1912. The present report includes the completion of the first year's work and the beginning of the second of this office.

GENERAL STATEMENT.

The general statements in the report submitted to the department August 22, 1911, concerning local municipal conditions and the drumming evil as they affect the interests of bathers are not substantially modified by important changes since that date.

At that time special emphasis was laid upon the inadequacy of the revenues of the city, upon the objectionable sources from which they have heretofore in large part been derived, and upon conditions more or less dependent thereon, detrimental to the interests of visitors, to the good repute of the community, and destructive of the confidence of physicians in the advisability of sending patients to Hot Springs. Attention was invited to the fact that under existing law the city contributes to the support of the county and of the State on the same basis as other cities, while, owing to the number of temporary residents constantly present, police and fire protection and all other public service utilities are needed for a city double the census population. This is practically equivalent to a reduction of the municipal revenues to about half those of other cities in the State. It was pointed out that at watering places abroad it has long been recognized that with a large nontaxable floating population it is impracticable to maintain satisfactory civic conditions on the same basis of revenue as pertains elsewhere, and that the value of these resorts to the people is largely dependent upon the improvements and services rendered possible by revenues specially provided for such purposes.

The five possible means for increasing the revenues of Hot Springs that have received most consideration are—

1. State legislation authorizing the retention by the city of a greater proportion of the taxes now authorized.
2. The assessment of an occupation tax.
3. The assessment of a bathing tax.
4. The Government ownership and operation of the baths combined with some form of Federal jurisdiction over the city, which would permit a portion of the revenue derived from the bathing of patients to be expended in the larger and general development of the resort.

5. Federal jurisdiction over all the territory set aside as the Hot Springs Reservation by the act of 1832 under a form of local government similar to that of the District of Columbia, to the end that the Federal Government should bear a part of the burden of providing for those from other States whose temporary residence in the community is largely due to its official sanction and control of the use of the water from the springs.

The most practical first step in the betterment of local municipal affairs is that of providing adequate revenues from clean sources. While there exists a general appreciation of the necessity for such action, public sentiment has not crystallized into the concerted effort necessary to achieve the desired results under any of the above plans.

Bills have been introduced in Congress to provide an adequate sewerage system, a new Government free bathhouse for the indigent, and for the investigation of the physiological and therapeutic effects of the water of the hot springs.

Considerable progress has been made in the paving of streets and laying of sidewalks during the year, but the maintenance of an efficient street-cleaning service is impracticable with the limited funds available.

A difficult, distressing and ever-present problem for the city authorities is that of providing for the large number of indigent invalids from other States, who come seeking the benefits to be derived from the baths. These sufferers come from every State, often as a last resort and in the hope that the water may effect a cure after their home physicians have failed to afford relief. Churches, fraternal organizations, relatives, and friends often contribute small amounts to enable the sufferer to obtain the benefits of a course of baths. Frequently a man arrives practically destitute and unable to work, thus becoming at once an object of charity. A considerable number come in the belief that the Government maintains, in conjunction with the free bathhouse, a hospital or home at which they will be cared for in every way. Not infrequently the progress of disease results in extreme helplessness and destitution. At times all has been spent in coming here for the relief of conditions in which the baths are of little benefit or are even contraindicated.

To more effectively render aid in this class of cases the Associated Charities was organized early in the year, and, under the efficient management of the secretary, Rabbi Rhine, relief and comfort were extended to many hundred in distress. Owing to lack of funds the work of this organization has been suspended, and again there are to be seen upon the streets many beseeching aid in their dual affliction of poverty and disease.

The erection of the Leo N. Levi Memorial Hospital by the B'nai B'rith Association is contemplated in the near future. This institution is to be devoted exclusively to charity work, and promises to afford relief to many of that class of patients for which heretofore no adequate provision has been made.

A factor of great importance in the development of Hot Springs as a health resort is the restriction of the right to prescribe the water of the springs to those practitioners who not only are qualified professionally, but whose appreciation of ethical and moral obligations is such as to insure their hearty cooperation with the Government in maintaining the best medical service.

The following quotation from an article by Dr. Baruch, which appeared recently in one of the leading medical journals, inviting attention to the necessity for the highest moral and professional attainments of physicians who practice at health resorts, to whose care and fidelity nonresident practitioners must necessarily intrust their patients, is worthy of careful consideration, as expressing the opinion of one who for many years has made a special study of the therapeutics of mineral springs and of climates:

The celebrated health resorts of Germany, which attract a multitude of people more or less afflicted with chronic diseases, do not owe their well-earned reputation so much to the climate and chemical composition of the waters or other local conditions as is generally supposed. These useful therapeutic elements would be absolutely inefficient if their application were not directed by the medical men residing in these resorts, who have made it a life study to investigate the climatic and balneological advantages of their respective springs, and have convinced their confères in all parts of the world by conscientious striving for the welfare of the patients committed to their care and by the intelligent application of their respective local advantages, and by close attention to and guarding of the sanitary arrangements of the springs. It is really more important for the physician who sends his patient to health resorts or springs to know the mental composition of the doctor than to know the barometric characteristics of the climate or the chemical composition of the waters. As an example, let me cite the recent marvelous growth of Nauheim as a resort for cardiac cases, which is due to the studies of Dr. Theodore Schott and his conscientious selection of cases adapted for the Nauheim waters. By scorning mercenary methods, unfortunately prevalent at many resorts, he has builded better than he knew, for the town of Nauheim has since his death become the mecca of patients from all parts of the world. It will retain its well-earned reputation so long as its physicians will utilize it judiciously, select the patients with care, and firmly decline to retain cases not adapted, though the material interests of the resort may seem to suffer.

Dr. Baruch's views as to the relative benefits to be derived from the physician, the water, and the climate at a health resort, and his condemnation of mercenary methods, may fairly be accepted as expressing the opinion of the majority of the medical profession.

The following paragraph from an editorial which has repeatedly appeared in a local periodical is also of interest as indicative of the confidence of the laity in the ability and integrity of the physician who has been accorded recognition by the Federal Government:

The physicians of Hot Springs are members of the State medical association, and besides they must pass under the scrutiny of the Federal medical board. Every physician on the registered list is approved by the Federal Government.

The visiting public are frequently confronted with statements similar to the above, which lead them to believe that the authority and control of the Federal Government over all registered physicians is absolute and complete.

FEDERAL REGISTRATION BOARD.

The Federal registration board has been intrusted with the duty of determining, subject to the approval of the department, the eligibility for registration of physicians who make application for authority to prescribe the water of the hot springs.

Rule No. 11 of the rules and regulations for the government of all bathhouses receiving hot water from the United States reservation provides in part as follows:

Physicians desiring to prescribe the waters of the hot springs, either internally or through the medium of baths, must first be registered * * *. Registration will be accorded only to such physicians as are found by a board, designated

by the Secretary of the Interior, to have proper professional qualifications and character and who do not engage in drumming for custom. No physician who shall engage in the solicitation of patronage, through the medium of drummers or otherwise, or who shall engage in unprofessional, disreputable, or dishonest conduct, or is addicted to the drug or other habit which disqualifies him for the performance of his professional duties, shall be or remain registered.

It is thus clearly the duty of the board to determine both the character and the professional qualifications of applicants. In the city of Hot Springs many patients are strangers. They are in need of the services of a physician and at once institute inquiries to determine the one best qualified to treat their particular ailment. As it is impracticable for the Government officials to recommend one registered physician in preference to another, they do not know how or where to obtain reliable information, and so are easily influenced in their choice by solicitors. Under these conditions it is of the utmost importance that a searching inquiry be made to determine the moral risk involved in according the privilege of registration, and such inquiry the board is frequently without means effectively to pursue. It is therefore recommended that the character of applicants be determined through an inspector of the department.

In the determination of the professional qualifications of candidates by the board, as at present constituted, it is possible that occasion might arise when an unsuccessful applicant should conceive that he had been unfairly treated; and while it may positively be stated that registration has not been denied any worthy to receive it, it is nevertheless true that those who successfully pass the examination and are registered immediately become competitors with the members of the board in the practice of their profession, and that such competition is much closer and more direct than usually exists between the members of an examining board and its licentiates. It is therefore believed that it would be an advantageous change in administration to follow the long-established custom of the Federal services which does not sanction the appointment of officers as members of examining or retiring boards, or of courts-martial, whose pay, emoluments, or status in the service might be affected by the acceptance or rejection of candidates or by the findings or sentence of the court. The establishment of a board of Federal medical officers to conduct the examinations is recommended as being in harmony with the precedent cited.

The only other duty assigned the Federal registration board is that of affording a hearing to registered physicians charged with drumming for custom, in violation of the rules and regulations. Further study of this evil as it exists here, and as it has existed for many years and still continues in other resort towns, both in this country and abroad, warrants the belief that its effective control is impossible under existing policies and conditions. The harassment of visitors in public places by solicitors has already quite effectively been eliminated, but so long as the income of the doctor, the hotel and boarding-house proprietor, the bathhouse operator, the druggist, and the manifold commercial interests supplying each of these, depends upon the number of transients cared for, the incentive for rebating and fee splitting will constantly be present and the practice continue because it is profitable.

Broadly speaking, doctor drumming may be attacked under three different policies:

1. By reducing the moral risk to a minimum through a rigid inquiry into the character of the applicant for registration, combined with the steadily maintained development of public sentiment against the practice.

2. Through punitive measures.

3. By removing the incentive.

While there are excellent reasons for the adoption of the first policy, observation teaches that reliance upon it alone is not likely to result in materially improved conditions within a reasonable time.

From the second policy little if any progress can be expected unless it be possible to convict offenders. During the past year 16 charges of drumming have been preferred against registered physicians and a hearing afforded them before the Federal registration board. In no single instance has evidence been introduced sufficiently conclusive to warrant the removal of the physician's name from the registered list.

The third policy, that of the removal of the incentive, can only be effected through such radical changes as are for various reasons impracticable.

IMPROVEMENT IN THE BATHHOUSES.

Under the policy of requiring bathhouse lessees to improve the sanitary conditions of their houses and to provide increased facilities for the bathing of patients before the renewal of leases considerable progress has been made.

The Superior bathhouse was closed March 31, 1911, and, owing to failure of the lessees to provide the improvements required, remains closed to date.

The old Maurice and Rammelsburg bathhouses were torn down and have been replaced by considerably larger modern sanitary fire-proof buildings. The Imperial also has been enlarged and so completely remodeled as practically to constitute a new building. These houses are provided with a complete blast system of ventilation, changing the air in every room five times per hour. They are finished in marble and tile throughout, equipped with vapors, hot-air and electric-light cabinets, hydrotherapeutic rooms and massage departments, and afford every facility for the carrying out of physicians' directions in administering the baths, and for the use of the water of the springs as a remedial agent. The old wooden furniture has been replaced by modern white enameled steel, carpets by tile floors, and draperies by plain sheets that can readily be laundered.

A complete ventilating system has been installed in a part of the Arlington bathhouse, and a modified system in the Lamar. Renovation to a greater or less degree, from minor repairs and painting up to extensive alterations, have been made in practically all houses, while extensive improvements are projected for the ensuing year in the Arlington, Eastman, Park, Majestic, Hale, and Moody bathhouses and the Ozark Sanatorium.

THE SERVICE OF THE BATHHOUSES.

There has been a steady increase in the efficiency of the service rendered in all bathhouses. Only standardized thermometers are now in use in administering the baths, and several houses supply liquid soap

in sanitary fixtures, thus effectually allaying the fear, so often expressed by bathers, of contracting disease from a cake of soap that had recently been used by another patient. Head attendants have been appointed to supervise the work in their respective departments, and a system of filing the bathing directions inaugurated which requires reference to them each time the bath is administered. The rules have been amended so as to require the use of sheets to absorb the perspiration after the baths in place of the bath robes, which could not readily be laundered and which soon became offensive.

Within the last few months a part of the laundering has been done in the city steam laundries and the more cleanly condition of the towels has been a source of much satisfaction. These plants are not equipped or operated so as to handle the work to the best advantage, and a central plant devoted exclusively to the bathhouse service is greatly needed.

Masseurs and mercury rubbers have been placed under the supervision of this office, and are required to register their qualifications. One masseur was suspended for 30 days for alcoholism and neglect of duty.

Attention is again invited to the impracticability of obtaining the best service in small houses, and the recommendation is renewed that leases be not extended without provision for enlargement to approximately 30 tubs. With the renewal of leases now pending this would provide all the tubbage necessary. Increase in the number of bathhouses is not recommended.

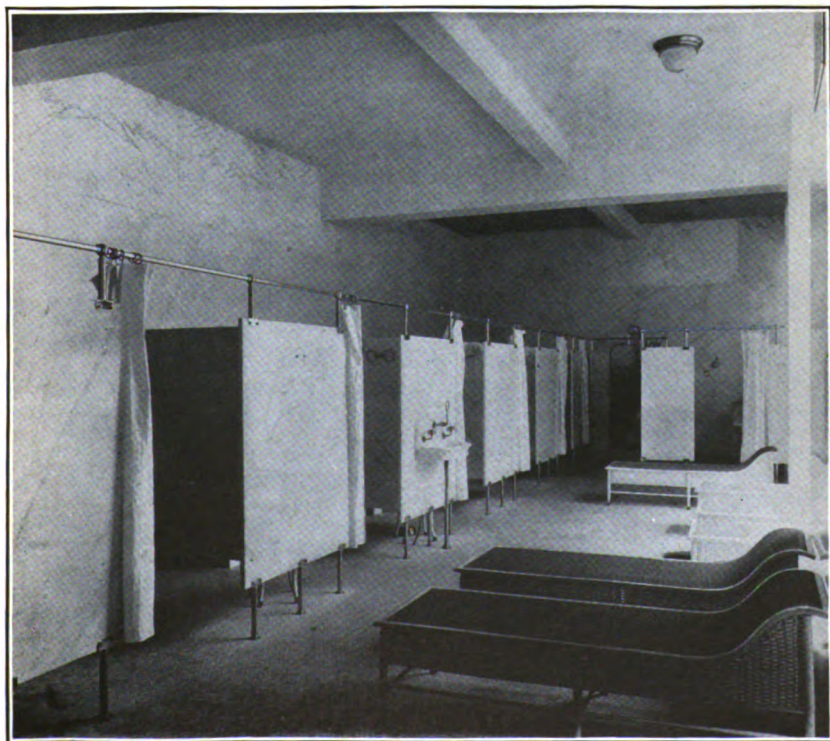
The value of frequent inspections and direct supervision over the administration of the baths is shown in the statements of registered physicians, to the effect that while formerly the bathing directions were more accurately carried out by the women attendants, the reverse now holds true. Regular inspections in the women's departments during bathing hours can not be made until such time as it is practicable to employ a woman for that purpose.

Table of the number of baths administered in the different bathhouses receiving water from the Hot Springs Reservation.

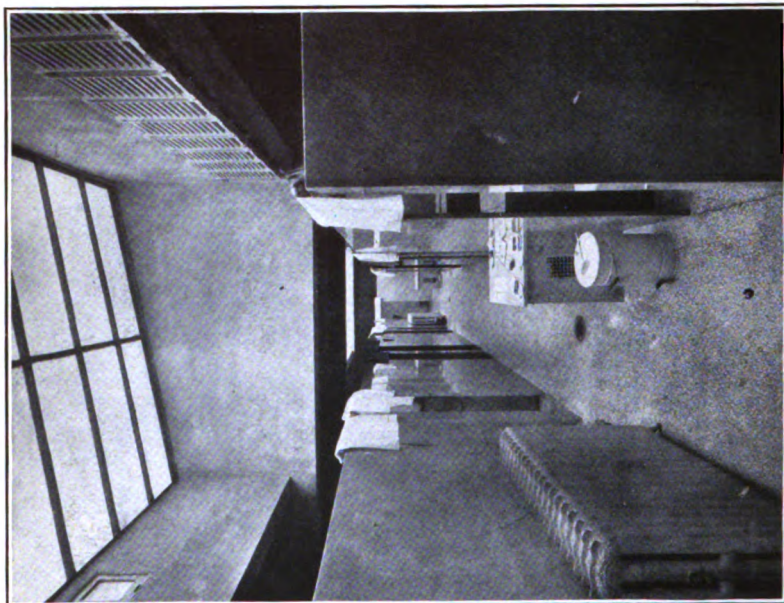
Name of bathhouse.	Whole tickets.	Half tickets.	Quarter tickets.	Single paid baths.	Number of baths sold.	Number of baths redeemed.
Alhambra.....	1,825	1,198	-----	2,173	50,653	7,732
Arlington.....	1,091	1,487	-----	4,876	42,657	5,467
Buckstaff.....	838	706	404	1,840	30,618	3,464
Crystal.....	271	704	-----	615	13,546	513
Eastman.....	421	609	-----	1,044	15,554	3,078
Great Northern.....	205	307	-----	1,447	9,868	1,215
Hale.....	940	879	-----	2,720	21,958	2,622
Horse Shoe.....	1,591	1,776	-----	839	52,110	4,213
Hot Springs.....	466	358	-----	971	13,975	1,532
Imperial.....	492	230	-----	594	9,498	738
Lamar.....	1,804	1,760	798	2,431	62,905	7,198
Magnesia.....	1,347	770	28	1,207	37,334	5,647
Majestic.....	1,461	1,009	-----	1,085	41,356	6,017
Maurice.....	1,707	1,123	540	1,902	49,972	4,990
Moody.....	734	615	-----	584	22,148	4,071
Ozark.....	3,498	2,838	1,504	4,158	107,839	12,321
Ozark Sanitorium.....	136	-----	-----	45	2,901	767
Palace.....	2,046	1,251	-----	1,623	57,009	7,432
Park (upper floor).....	290	294	-----	341	9,871	1,173
Park (lower floor).....	948	487	-----	343	24,414	2,973
Rector.....	455	359	89	448	14,018	2,001
Rockafellow.....	1,369	569	-----	1,303	39,642	3,656
St. Joseph's Infirmary.....	386	198	-----	-----	10,066	779
Total.....	24,356	19,429	3,358	34,284	750,012	90,308



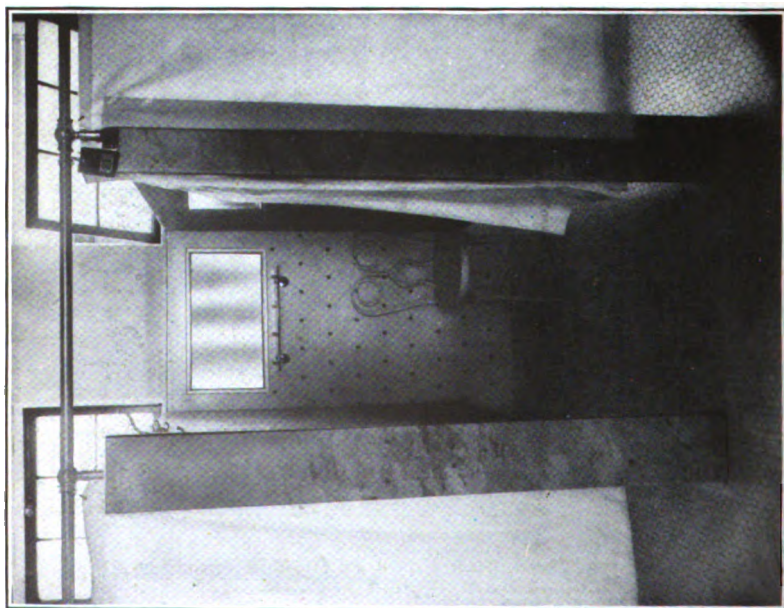
WOMEN'S DRESSING ROOM IN ONE OF THE NEW BATHHOUSES.



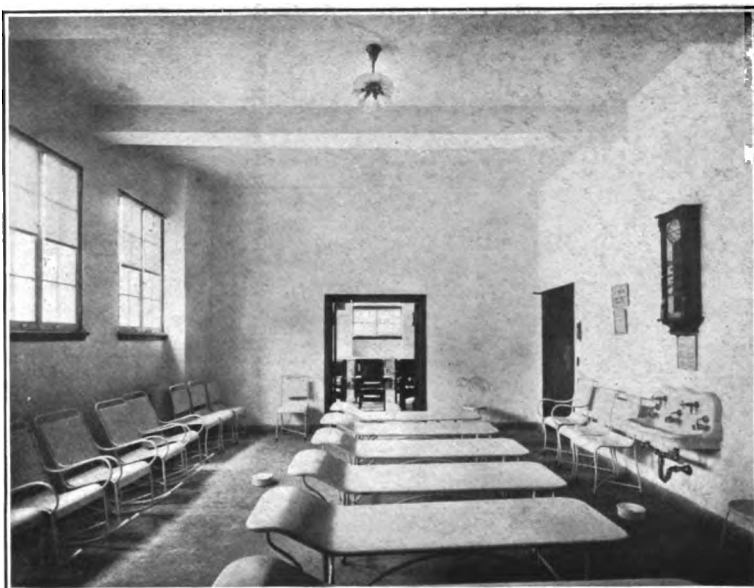
SIDE OF MEN'S BATH HALL IN ONE OF THE NEW BATHHOUSES, SHOWING BATH STALLS.



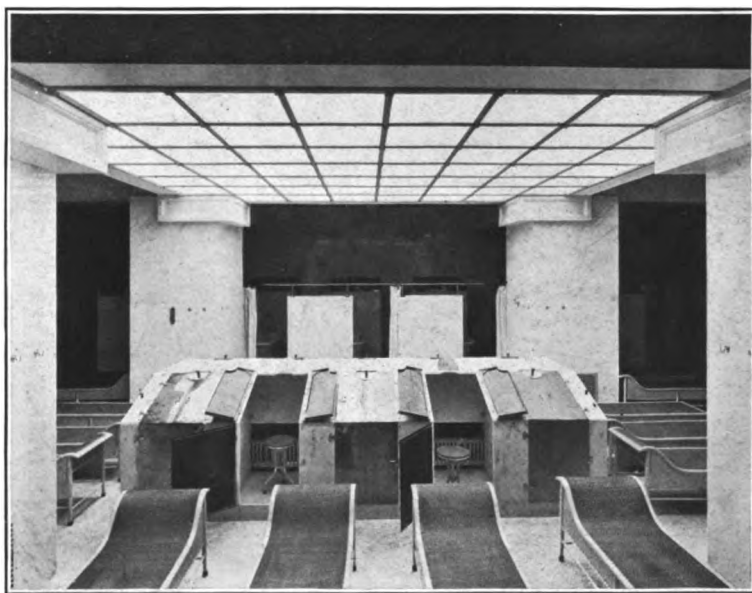
AISLE BETWEEN BATH STALLS IN ONE OF THE NEW BATHHOUSES.



DRESSING STALL IN ONE OF THE NEW BATHHOUSES.



COOLING ROOM IN ONE OF THE NEW BATHHOUSES.



INTERIOR OF MEN'S BATH HALL IN ONE OF THE NEW BATHHOUSES, SHOWING HOT-PACK COUCHES, HOT-AIR CABINETS, AND REGISTERS FOR PEDESTAL DISTRIBUTION OF HEAT AND AIR.

Table of the number of baths administered in the different bathhouses receiving water from the Hot Springs Reservation—Continued.

Name of bathhouse.	Net paid baths.	Compli- men- tary baths.	Amount paid for redeemed baths.	Total re- ceipts less redemptions.	Total ex- pense of operation.	Net loss.	Net profit.
Alhambra.....	42,921	-----	\$2,244.06	\$12,612.20	\$7,466.80	-----	\$5,146.40
Arlington.....	37,200	-----	2,646.85	13,280.55	14,204.25	-----	4,066.30
Buckstaff.....	27,154	42	1,732.25	13,199.75	9,065.27	-----	4,134.48
Crystal.....	12,958	-----	118.65	2,256.10	3,850.80	-----	-----
Eastman.....	12,476	-----	1,589.80	6,289.40	4,721.86	-----	1,567.54
Great Northern.....	8,148	-----	410.80	2,673.86	4,054.80	-----	-----
Hale.....	29,331	24	874.80	9,778.25	4,506.40	1,380.94	5,299.85
Horse Shoe.....	47,897	21	1,045.00	10,654.10	5,897.05	-----	4,757.05
Hot Springs.....	12,392	-----	569.10	7,781.50	5,279.50	-----	2,451.91
Imperial.....	8,709	-----	394.40	5,859.03	3,601.06	-----	1,067.99
Lamar.....	55,712	51	2,697.20	20,059.60	8,768.68	-----	11,290.92
Magnesia.....	31,687	191	1,592.15	8,498.05	5,750.45	-----	2,738.60
Majestic.....	35,239	-----	2,713.30	14,698.00	7,860.76	-----	6,737.24
Maurice.....	44,982	63	2,495.15	22,585.95	10,558.14	-----	12,027.81
Moody.....	18,077	21	1,546.77	6,627.18	3,233.03	-----	3,394.15
Ozark.....	95,548	240	2,969.15	22,102.80	6,651.40	-----	15,451.40
Ozark Sanitorium.....	2,124	-----	280.15	689.45	642.75	-----	28.70
Palace.....	49,667	64	2,477.60	14,151.56	5,866.48	-----	8,285.08
Park (upper floor).....	8,693	10	557.40	4,233.10	3,311.75	-----	921.35
Park (lower floor).....	21,436	35	1,090.22	7,518.78	5,235.90	-----	2,282.88
Rector.....	12,017	-----	762.80	4,365.90	3,564.40	-----	801.50
Rockafellow.....	35,987	-----	1,218.55	11,463.60	6,750.65	-----	4,712.95
St. Joseph's Infirmary.....	9,307	-----	259.80	3,596.20	974.00	-----	2,622.20
Total.....	659,648	762	32,125.94	229,277.98	181,411.27	2,475.64	100,342.30

GOVERNMENT FREE BATHHOUSE.

Attention is again respectfully invited to the necessity for a new bathhouse for the indigent. Each year this need becomes more urgent. A few minor repairs have been made, but the conditions outlined in the report of last year remain substantially unchanged. In the new building there should be provided suitable office and laboratory accommodations, examining rooms, a dispensary, hydrotherapeutic rooms and emergency wards for both sexes, a classroom to be used in instructing the corps of bath attendants, larger dressing and cooling rooms, hot-air and vapor cabinets, a considerably increased number of tubs, lockers, toilets, and urinals, as well as accommodations for the bathing of children and for the use of the water in the treatment of the ailments of women. Arrangements should also be made for the separation of infectious and noninfectious cases, and for the seclusion of those suffering from offensive and loathsome diseases.

The necessity of better provision for the treatment of indigents is frequently commented upon by visitors, some of whom have voluntarily expressed their willingness to ask their Representatives in Congress to further measures necessary to afford relief.

Baths administered at the Government free bathhouse for the fiscal year 1911-1912.

Applications for free baths.....	7,281
Applications for free baths refused.....	760
Tickets issued on original application.....	6,521
Tickets reissued on original application.....	5,958
Total baths given white males.....	101,804
Total baths given white females.....	16,510
Total baths given colored males.....	28,082

Total baths given colored females	11, 288
Total baths given during year	157, 664
Average number of persons bathed daily	517
Soldiers and sailors bathed	407

BATH ATTENDANTS.

Three hundred and thirty-one bath attendants have attended the class of instruction. Of this number 206 passed a satisfactory examination and have been granted licenses for the calendar year. One hundred and twenty-five were rejected. A number who failed attended night school, learned to read and write, and after again taking the course of instruction succeeded in qualifying. Only a very few who are unable to read the bathing directions remain. The opportunity to qualify for service in the bathhouses has now been extended to all who were working at the time the rule requiring them to obtain a license became effective. All attendants are required to display their certificates of qualification, neatly and uniformly framed, at their post of duty, and to wear the badge prescribed by the department, which bears the words "Licensed bath attendant, Department of the Interior, Hot Springs Reservation." These are serially numbered, and serve not only as a mark of qualification, but also enable bathers to report to this office the number of any attendant who fails to render satisfactory service. All attendants are required to furnish a certificate signed by a registered physician to the effect that they have been examined and are immune from smallpox. Managers are required to report the employment, suspension, resignation, or discharge of attendants. Individual record files are maintained in which already much information is recorded of value in determining the renewal of licenses from year to year, as well as affording managers the opportunity of determining the character and efficiency of attendants before employing them.

The bathhouse rules have been amended so as to require the appointment of head attendants to supervise the administration of the baths, the treatment of patients, matters of hygiene and sanitation in the bathhouses, and the work of the bath attendants generally. The duties and obligations of attendants have more clearly been defined, and managers prohibited from requiring them to bear any expense incident to the operation of the house not specifically authorized.

Misconduct or lack of attention to duty has been corrected by verbal warning, by official reprimand, or by suspension. In each instance copies of the order issued have been furnished the managers of all bathhouses.

Five attendants were suspended for 10 days—two for neglect to use a thermometer in administering the baths, two for failure to read the bathing directions, and one for personal untidiness. Two others were suspended for 30 days—one for advising a patient to rub mercury, and the other for neglect of duty. Three were discharged after two consecutive failures to obtain a license.

The attendants at the Government free bathhouse have been relieved from duty on Sundays and legal holidays. One additional attendant has been employed and an eight-hour schedule instituted.

Authority has been granted for the employment of substitutes during the 15 days' annual and sick leave authorized for attendants, and the pay of the male attendants has been increased from \$45 to \$50 per month.

PHYSIOLOGICAL EFFECTS OF THE WATER OF THE HOT SPRINGS.

In recent years the therapeutic value of mineral springs has with increasing insistency been brought to public notice, both by the medical and lay press, in all parts of the world. The interest thus created may fairly be said to have assumed a more or less concerted effort to class these waters as national resources or public utilities, to provide for their proper use, and to preserve them from the abuses of commercial exploitation. This movement is more advanced abroad, notably in Germany, than in this country. The recent discovery of radium and its remedial properties in certain diseases for which treatment has heretofore been more or less unsatisfactory, together with the later observation that the waters of certain mineral springs, which for years have enjoyed the reputation of effecting marvelous cures, is radioactive, has attracted much attention, with the result that some of the foremost laboratory workers are now engaged in the study of radioactive waters and their application to the cure of disease.

In the annual report of last year it was recommended that investigations by competent research workers, to determine the physiological effects of the water of the hot springs, be instituted and the results published for the benefit of the people. The subject was carefully considered by the department and the desirability of conducting such a series of experiments amply confirmed by many men prominent in the field of medicine. A bill authorizing such investigations has recently been introduced in Congress. In view of the importance of the subject and the value of the work to people in all parts of the country, its prompt passage is greatly to be desired.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

The SECRETARY OF THE INTERIOR.

APPENDIX.

PHYSIOLOGICAL AND THERAPEUTICAL EFFECTS OF THE WATERS OF THE HOT SPRINGS OF ARKANSAS.¹

DEPARTMENT OF THE INTERIOR,
Washington, June 7, 1912.

HON. JOSEPH T. ROBINSON,
*Chairman Committee on the Public Lands,
House of Representatives.*

DEAR SIR: Your letter of May 28 has been received, inclosing with request for report thereon H. R. 24737, "to authorize the investigation of the physiological and therapeutical effects of the waters of the hot springs of Arkansas and to report upon the application of these waters to the alleviation and cure of diseases." The bill in question is as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sum of fifty thousand dollars, or so much thereof as may be necessary, be, and the same is hereby, appropriated to investigate the physiological and therapeutical effects of the waters of the hot springs of Arkansas and to report upon the application of these waters to the alleviation and cure of diseases, including the employment of all persons necessary in carrying on the work, the purchase of laboratory apparatus, equipment, and other supplies, the renting of building and other appurtenances, and all other expenses necessary to effectuate such investigation, to be expended under the supervision of the Secretary of the Interior and to continue available until expended.

SEC. 2. That the Secretaries of the Treasury, of the War, of the Navy, and of the Agricultural Departments, respectively, are hereby directed to cooperate with the Secretary of the Interior in such investigation, by detailing competent officers, and by extending all hospital, laboratory, and other facilities necessary and desirable in the carrying on of such investigation.

In response thereto I have to state that the minutes of the sixty-second annual session of the American Medical Association, Los Angeles session, June 26 to June 30, 1911, as published in the official journal of that organization, provides, among other things:

Proposal to examine radioactive waters.—Owing to the importance attributed to radioactive mineral waters in the treatment of gouty and other affections by competent European observers, and the special interest excited by the symposium on the subject at the Thirty-second Pharmacologic Congress recently held in Berlin, the section on pharmacology and therapeutics of the American Medical Association requests the house of delegates to suggest to the United States Government the advisability of investigating the radioactivity of the various mineral waters of the United States and publishing the result for the benefit of the medical profession.

Dr. Harry M. Hallock, medical director of the Hot Springs Reservation, under date of July 10, 1911, invited attention to the great and widespread faith in the curative properties of the water and to the

¹ A report of the Secretary of the Interior on H. R. 24737 (62d Cong., 2d sess.), "A bill to authorize the investigation of the physiological and therapeutical effects of the waters of the Hot Springs of Arkansas and to report upon the application of these waters to the alleviation and cure of diseases." (H. Doc. 905, 62d Cong., 2d sess.)

recognition of the benefits to be derived from its use, as exemplified by the act of Congress in establishing the reservation of the Hot Springs, stating, among other things:

The intelligent application of any remedial agent, as distinguished from quackery, depends fundamentally upon definite knowledge as to the effects upon the living organism which may be expected to follow its exhibition, and these have never been determined with reference to the water of the hot springs, at least in detail and with the scientific accuracy requisite for announcement to and acceptance by the medical world.

The relation of the Federal Government to the springs and the authority it exercises with reference to the prescribing of the water would appear to amount to a recommendation for its use in certain cases, and consequently it may be assumed that there devolves an obligation to determine, so far as may be possible, in what cases it is of real value, and how it influences the functions of the various organs of the body.

Subsequently, in February, 1912, the medical director was instructed to take up the subject of the investigation of the physiological effects of the waters from the hot springs and submit a report thereon; and there is herewith transmitted for your information a copy of his letter of April 19, 1912, embodying a detailed report on the subject, together with copies of letters received by him from the representatives of the leading medical colleges in the United States and members of the medical profession, expressing their views on the advisability of the inauguration of the investigation in question.

In the interest of the afflicted who resort to Hot Springs for the purpose of procuring the benefit of the thermal waters on the reservation it is highly desirable that experiments be inaugurated at the earliest practicable date to determine, as far as may be possible, the exact physiological action of the waters from these hot springs, and I have to recommend that the legislation contemplated in the bill receive early and favorable consideration.

Very respectfully,

CARMÍ A. THOMPSON,
Assistant Secretary.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., July 10, 1911.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

SIR: I have the honor to recommend that a competent physiological chemist be employed to conduct a series of experiments with a view to determining, as far as may be possible, the exact physiological action of the water of the Hot Springs.

In this connection attention is invited to the great and widespread faith in the curative properties of the water and to the recognition of the benefits to be derived from its use, as exemplified by the act of Congress in establishing the reservation of the Hot Springs.

The intelligent application of any remedial agent, as distinguished from quackery, depends fundamentally upon definite knowledge as to the effects upon the living organism which may be expected to follow its exhibition, and these have never been determined with reference to the water of the Hot Springs, at least in detail and with the

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Very respectfully,

HARRY M. HALLOCK,
Medical Director.

[Extract from the report of the medical director of the Hot Springs Reservation for the year 1911.]

The physiological effects of the water have never been scientifically and accurately determined, and as its rational use can not be thoroughly understood in any other way it is recommended that a competent physiological chemist be employed to conduct a series of experiments in this direction.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., April 19, 1912.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

SIR: The letter from the department of February 14, 1912, with reference to the proposed investigation of the physiological effects of the water of the hot springs reads in part as follows:

I have to request that you will take up the subject with the other members of the Federal registration board and submit a general outline as to the amount of money which you think should be appropriated by Congress for this purpose, such appropriation to include compensation of physicians employed, laboratory facilities, appliances, and hospital facilities in connection with the matter.

In reply I have the honor to state that in compliance with the above instructions a circular letter, a copy of which is herewith inclosed and marked "A," was sent December 19, 1912, to the secretaries of a number of the leading medical colleges, requesting that it be referred to an appropriate committee of the faculty and that said committee be requested to submit one or more names of persons qualified to undertake the work. Subsequently more detailed communications were sent to those recommended and March 18, 1912, another circular letter, a copy of which is inclosed herewith and marked "B," was sent to all the members of the American Association of Biological Chemists and to most of the professors of the practice of medicine and of materia medica and therapeutics in the class A medical colleges. All of the replies received to date are inclosed for the information of the department.

Consideration of this correspondence and of known facts would appear to justify the following conclusions:

1. Many representative nonresident practitioners view the therapeutic resources of hot springs with distrust because the physiological action of the water never has definitely and scientifically been determined by competent investigators uninfluenced by personal interests.

2. It is evident that there is a suspicion in the minds of some that the water of the hot springs has no curative properties not possessed by any water heated to the same temperature. If this be so the public and the medical profession are as much entitled to this information as to know what, if any, its distinctive therapeutic properties are. No other view can ethically be sustained.

3. The legitimate therapeutic value of the water and of the resort should be determined in order that those who are suffering from ailments that can be alleviated by treatment at the springs may know of that fact as well as that those who can not so be benefited may not be misled. The act of Congress which reserved and protected the water of the hot springs for the use of the people amounted to a positive and official declaration that it possesses unique and valuable therapeutic properties. In administering the affairs of the Hot Springs Reservation the Government is to all intents and purposes practicing medicine on an enormous scale in the sense that it sanctions and recommends to the people of the entire country the use of a particular remedial agent. Many thousands, having faith in the Government's indorsement, make use of this remedy each year, often coming from distant States at an expense that they can ill afford. Many unquestionably are greatly benefited; others would have been better off had they sought treatment elsewhere or remained at home. The Government is under much the same moral obligation to determine the physiological effects of the remedy it sanctions and to safeguard and provide for its proper and successful administration as is the individual practitioner when he prescribes a drug.

4. The therapeutic value of radium is established, and the study of the physiological effects of natural radioactive spring waters is now occupying the attention of some of the foremost laboratory workers and clinicians of Germany.

5. There is a reasonable assurance that properly conducted investigations would afford definite scientific data of real and lasting value to the medical profession and through them to the people.

6. It is absolutely essential that the proposed investigations, to be of value and to warrant acceptance by the medical profession, should be exhaustive in scope and cover several allied fields of research. They should be conducted by a commission composed of the foremost men in their respective fields. Physicians having personal interests that might be influenced or that might influence them should not be appointed. It is very desirable to identify with the work the Carnegie and Rockefeller institutions for medical research, the Bureau of Chemistry of the Department of Agriculture, and the Public Health and Marine-Hospital Service.

7. The investigations of the commission should deal with the entire field of the application of the waters of the hot springs to the relief and cure of disease and not be confined merely to a study of its physiological effects. Under these conditions it is believed they might properly and advantageously express opinions and make recommendations covering all of the subject matter included in the annual report of the medical director and thus greatly assist in the development of public sentiment for a satisfactory solution of many difficult problems. The report on the physiological action of the water could be rendered

separately if desired and the other subjects, which are of almost equal importance to the welfare of patients, covered in a supplementary paper.

8. It is useless to attempt such work through any less thorough and far reaching investigations and without an adequate appropriation.

9. At least two years will be required for the work.

10. Whatever may be determined as to the specific curative properties of the water there can be no doubt but that there is ample justification for the maintenance of a resort of an essentially national character at the springs. Should the commission determine definitely that the water is of therapeutic value, even in a restricted group of ailments, the importance of having that fact attested to the medical profession through the type of commission contemplated can scarcely be overestimated. Such a report would be accorded international circulation and text books on the practice of medicine would soon contain references to treatment at Hot Springs as they now indicate the class of cases suitable for "the cure" at Carlsbad or Nauheim.

It is impossible at the present time to prepare an accurate estimate for the necessary appropriation. By referring to the letters of Profs. L. B. Mendel and Victor Vaughan it will be seen there is a considerable variation in the figures given. The cost will vary greatly in accordance with the scope of the investigation and the personnel and number of the members of the commission, and can only be determined accurately after organization and the outlining of the work. Prof. Mendel suggests that it might be possible to induce desirable men to serve for an honorarium, traveling expenses, and a per diem allowance. The cost will be materially lessened if the facilities of the Army and Navy General Hospital be obtained, if a laboratory can be established there, and if competent investigators can be detailed from the other Federal medical services. Much will depend upon the number of healthy individuals experimented upon or used as controls, as such men would have to be paid not less than a dollar a-day plus subsistence and hospital accommodations.

Of the members of the Federal registration board, Drs. Dake and Steer are of the opinion that \$100,000 will be required; Dr. Martin believes that \$75,000 will suffice.

It is recommended that an effort be made to secure an appropriation of \$50,000. This is believed to be a reasonable request in view of the importance of the work and will suffice to outline, inaugurate, and pursue the investigations for a period of from one to two years. At the expiration of this time if satisfactory conclusions have not been reached there will undoubtedly be data available from which the advisability of requesting an additional appropriation can be determined.

The detailed estimate inclosed is as accurate as I have been able to prepare in view of the unusual character of the work. It provides for every necessary expenditure for the period of two years, the estimates for the first and second years being shown separately. There is attached to the estimate a bill for the desired appropriation.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., December 19, 1911.

The SECRETARY, UNIVERSITY OF COLUMBIA,
New York City.

DEAR SIR: The Secretary of the Interior has directed me to make due inquiry and ascertain if possible the name of some physiological chemist competent to conduct a series of experiments with a view to determining, so far as may be practicable, the exact physiological effects of the water of the hot springs of Arkansas. These investigations should be made by one whose standing and qualifications are such that the findings will be accepted by the medical profession as reliable scientific research. I therefore beg to inquire if it would be practicable for you to refer this matter to an appropriate committee of the faculty with the request that they submit one or more names of persons qualified to undertake this work.

It has already been determined that there is no officer of the Medical Department of the Army, the Navy, or the Marine-Hospital Service available.

Thanking you for any assistance you may be able to render, I have the honor to remain,

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

A letter similar to the one attached was also sent to the following:

The secretary, Harvard University, Cambridge, Mass.
The secretary, University of Pennsylvania, Philadelphia, Pa.
The secretary, Johns Hopkins University, Baltimore, Md.
The secretary, Jefferson Medical College, Philadelphia, Pa.
The secretary, University of Chicago, Chicago, Ill.
Dr. Alexander R. Craig, secretary, the American Medical Association, Chicago, Ill.

Letters received from representatives of leading medical colleges and members of the medical profession in relation to proposed investigation of the physiological and therapeutic effects of the waters of the hot springs of Arkansas.

THE UNIVERSITY OF CHICAGO, *January 31, 1912.*

DR. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: Your letter of the 19th ultimo, asking the names of one or more persons qualified to investigate the action of the waters of the hot springs and directed to the secretary of this university, has been referred to me.

I would suggest the names of the following physiologists who would be qualified to undertake the work you mention:

1. Dr. Ralph S. Lillie, department of zoology, University of Pennsylvania.
2. Prof. E. P. Lyon, professor of physiology, St. Louis University, St. Louis, Mo.
3. Prof. Waldemar Koch, assistant professor of pharmacology, of this university.

4. Prof. Abel or Howell of Johns Hopkins University, Baltimore, Md.

There are many other names which might be given, but these occur to me as men of ability who have worked along these lines.

Very truly, yours,

ALBERT P. MATHEWS.

JOHNS HOPKINS UNIVERSITY,
DEPARTMENT OF PHARMACOLOGY,
Baltimore, December 29, 1911.

DR. HARRY M. HALLOCK,
*Medical Director, Department of the Interior,
Hot Springs Reservation, Hot Springs, Ark.*

DEAR SIR: Your letter of recent date in reference to a physiological chemist has been referred by the registrar to me. I would suggest that you apply to the council on pharmacy and chemistry of the American Medical Association, 535 Dearborn Avenue, Chicago, Ill., for assistance in this matter. You will be almost sure to learn from them of some one who can do this work for you.

Very truly, yours,

JOHN J. ABEL.

JOHNS HOPKINS UNIVERSITY,
DEPARTMENT OF PHYSIOLOGY,
Baltimore, Md., February 26, 1912.

DR. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: I beg to acknowledge the receipt of your letter of February 20 in regard to the investigation of the physiological action of the waters of the hot springs. As your letter was directed to Prof. Abel W. Howell, I am a little uncertain whether it was meant for my colleague Prof. J. J. Abel or for myself. For myself I can only say that it would scarcely be possible for me to leave my work to engage in such an investigation. It would seem to me that if adequate facilities can be obtained such an investigation might yield very interesting and possibly practically valuable results. If I were directing the work I should want to make a preliminary investigation upon animals—dogs or rabbits—since naturally in some respects this would enable the experimenter to control his results more satisfactorily. Such results as were obtained could then be studied by way of corroboration upon man. The action of the water ought to be studied upon the general metabolism, the respiratory exchange, heat production (calorimetric), blood and circulation, reactions of the nervous system, excretion, etc.

If you could obtain his services, Prof. Mendel (L. B. Mendel), Yale University, New Haven, Conn., would probably be the best qualified man. If he can not accept such work himself he may be able to designate a younger man who will carry out experiments under his directions.

Very truly, yours,

W. H. HOWELL.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 29, 1912.

Prof. L. B. MENDEL,
Yale University, New Haven, Conn.

SIR: There is under consideration by the Secretary of the Interior the advisability of conducting a series of experiments to determine the physiological effects of water of the hot springs of Arkansas. Over 100,000 people visit this resort each year and the therapeutic value of the baths in certain conditions is well established. It is believed that an appropriation by Congress can be obtained to carry on these experiments and it is thought that a physiological chemist working in conjunction with a commission consisting of the medical director of the Hot Springs Reservation, the Federal board of medical examiners and possibly one or two delegates from the County Medical Society would be able to thoroughly study and scientifically investigate both the therapeutic and the physiological effects and to place before the medical profession experimental data of value.

It is believed that the cooperation of the Secretary of War, the Secretary of the Navy, and the Public Health and Marine-Hospital Service can be secured as well as the facilities of the Army and Navy General Hospital. The work would probably extend over at least a year and possibly longer.

Your name has been suggested as one eminently competent in the research field and I therefore beg to inquire as to whether in your opinion it would be possible to obtain results from this line of work that would be of real value to the medical profession and commensurate with the expenditure involved.

Would you be willing to accept such an appointment if it were formally tendered to you and at what compensation? Could you give an estimate of the probable total cost including your own compensation, that of all necessary apparatus and supplies, the employment of subjects for experiments in the study of blood and excretory changes, etc., covering the work of the commission for the period of one year?

There are enclosed for your information certain papers and reports that it is believed may be of interest in connection with the subject.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

A copy of the attached letter was also sent to the following:

Prof. E. P. Lyon, professor of physiology, St. Louis University, St. Louis, Mo.

Prof. Waldemar Koch, assistant professor of pharmacology, University of Chicago, Chicago, Ill.

Prof. Abel W. Howell, Johns Hopkins University, Baltimore, Md.

Dr. Ralph S. Little, department of zoology, University of Pennsylvania, Philadelphia, Pa.

Prof. Jacob Rosenbloom, College of Physicians and Surgeons, 437 West Fifty-ninth Street, New York City, N. Y.

Prof. Victor Vaughan, M. D., University of Michigan, Ann Arbor, Mich.

Prof. A. E. Taylor, Medical School, University of Pennsylvania, Philadelphia, Pa.

SHEFFIELD LABORATORY PHYSIOLOGICAL CHEMISTRY,
YALE UNIVERSITY,
New Haven, Conn., March 6, 1912.

DR. HARRY M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

MY DEAR SIR: I desire to acknowledge the receipt of your letter of February 29, with reference to the possibility of a series of experiments to determine the physiological effects of the waters of the hot springs.

In view of the importance and scope of the questions raised in your communication, it will be necessary for me to delay a formal and definite reply until I can consider with some care the problems which are involved therein. Any investigation along the lines outlined by you will call for careful and exhaustive studies in several related fields; and in order to give you some facts and opinions which are likely to be of any value to you I must ask for a brief time in which to give questions at issue and the probability of useful outcome to research more careful consideration. I assume, from statements in the documents which you forwarded to me, that at the present time the unique therapeutic properties of the spring waters are in good part ascribed to radio-active manifestations. These are, as you well know, being widely investigated in some of the foremost laboratories of Europe.

Very respectfully,

LAFAYETTE B. MENDEL.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., March 12, 1912.

PROF. LAFAYETTE B. MENDEL,
*Sheffield Laboratory of Physiological Chemistry,
Yale University, New Haven, Conn.*

MY DEAR SIR: I beg to acknowledge your letter of March 6 in reply to mine of February 29, 1912, and thank you sincerely for the interest and attention you have given the matter. Should the investigations be undertaken it will doubtless take some time to arrange the details, but there is one point that it is greatly desired to have settled at once and that is the determination of the sum to be requested from Congress for carrying on the work. This must be determined by April 1 in order to have the bill presented during the present session.

I am in receipt of a letter from the department which reads in part as follows:

I have to request that you will take up the subject with the other members of the Federal registration board and submit a general outline as to the amount of money which you think should be appropriated by Congress for this purpose, and such appropriation to include compensation of physicians employed, laboratory facilities, appliances, and hospital facilities in connection with the matter.

In submitting the estimate of the amount to be appropriated for this purpose a lump sum will be asked for, out of which all necessary expenses, including compensation of experts, etc., is to be paid, and it is also proposed to suggest to Congress that the Secretary of War, the Secretary of the Navy, and the Public Health and the Marine-Hospital Service, be authorized to cooperate with this department in handling the subject, the entire matter to be under the supervision of the Secretary of the Interior.

It would be of material assistance if you would be willing to give at least an approximate estimate as to the necessary expenditures basing the figures on the work of such a commission for the first year, and also if you could express an opinion as to the number of years that would be required to complete the work.

It is believed that hospital facilities can be obtained at the Army and Navy General Hospital without cost other than the subsistence of patients. Information is especially desired as to the probable cost of the following items:

Compensation of expert.

Compensation of assistant.

Chemical laboratory equipment and operation (exclusive of building).

Number and cost of animals used for experimental purposes.

Number of healthy subjects to be employed for experimental purposes.

Number of patients to be observed.

Thanking you for any assistance you may be able to render, I am,

Very truly, yours,

HARRY M. HALLOCK,
Medical Director.

SHEFFIELD LABORATORY OF
PHYSIOLOGICAL CHEMISTRY, YALE UNIVERSITY,
New Haven, Conn., March 18, 1912.

DR. HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

MY DEAR SIR: I desire herewith to reply to your letters of February 29, and March 12, in regard to the advisability of undertaking a series of investigations upon the therapeutic and physiological effects of the baths at the Hot Springs Reservation. Several distinct questions raised in your communications must be answered independently.

In considering the probable value of any further elaborate research on the physiological effects of the waters it must be borne in mind that there already exists an enormous literature on balneotherapy. The Government circular which accompanied the documents sent to me states that "the therapeutic value of the baths is dependent upon the radioactivity of the waters." This aspect of the subject has been under consideration in very recent years only. The observations on the physiological and therapeutic effects of radium emanation which have lately been reported by competent observers, e. g., from the clinics of His in Berlin and Von Noorden in Vienna, encourage the belief that there is a useful field of investigation in this direction which deserves careful and speedy attention. In justification for this statement I may quote from a recent communication from Prof. von Noorden and Dr. Falta in Vienna:

Die Emanationskuren haben einen mächtigen Einfluss auf wichtige Stoffwechselprozesse und auf den Erregungszustand des vegetativen Nervensystems und erfordern ebenso wie die Behandlung mit Kohlensäurebädern und andere Bade- oder Trinkkuren volle Hingabe an die Anforderungen der Kur. Es scheint ratsam, die Emanationen hauptsächlich in Kurorten, Spitalern und Sanatorien zu errichten, wo die Patienten aus der Berufsarbeit ausgeschaltet sind. Naturgemäss werden hierfür solche Kurorte die günstigsten Verhältnisse darbieten, wo auch natürliche Radiumbäder zur Verfügung stehen.

Emanation cures have a powerful influence on important processes of metabolism and on the excitability of the living nervous system and require, the same as treatment with carbonic acid and other bathing and drinking cures, a complete compliance with the requirements of the treatment.

It appears advisable to establish emanation cures principally in bathing resorts, hospitals, and sanatoria, where the patients are removed from the usual work of their respective occupations.

Naturally the most favorable conditions will be afforded by bathing resorts where natural radium baths are also available. (Translation of German quotation.)

I have no specific information at hand regarding the actual composition of the hot springs water; but if their radioactive properties are of sufficient significance to warrant scientific exploitation in the form here indicated, a careful and responsible investigation along the lines proposed is, in my judgment, both desirable and timely.

With respect to the conduct of such an investigation I am convinced that the cooperation of a number of men in different departments of research whose fitness in respect to both training and ability is widely recognized, would alone give any report the prominence and authority which is desired. No investigation will be worth while which fails to carry with it the stamp of scientific excellence and critique. In view of the circumstances involved it seems to me most practicable to have the responsibility for the plan and general execution of such an investigation invested in a commission. The latter should include men of acknowledged capacity in medical fields and the underlying sciences, both clinicians and physiologists (which of course includes the physiological chemist) who could not only broadly direct the scope of the work, but what is equally important could competently criticize and evaluate the data. The general objection to a commission constituted of delegates from county medical societies, etc., as indicated in your letter of February 29, lies in the unfitness of such individuals, as a rule, to contribute in any peculiarly useful or expert way to the real duties of such a commission. Their work is likely to be perfunctory, subject to the bias of local traditions or the influence of important home interests. It might also be difficult to induce first-class investigators to work under the direction of an unsympathetic board. A further highly advantageous feature of the commission system constituted of several competent scientists is the presumable elimination of the danger of errors from the judgment of single individuals. We have suffered enough in this country from such one-man pronouncements. Much useless and uncalled for work has been done in the name of science and under authoritative sanction owing to the elimination of critical review by competent colleagues.

The cost of a comprehensive investigation along the lines suggested will, of course, depend on its scope and on the personnel of the commission. Having in mind the necessary laboratory facilities and equipment, a number of laboratory workers (chemists, assistants, and helpers), eight or ten subjects, and their maintenance, and experimental animals, I estimate an outlay of at least \$1,500 per month in this direction. To this should be added an initial cost of establishing a laboratory outfit. In Hot Springs (where no such outfit is now available) this ought not to exceed \$2,000. To complete the budget for the first year the salary of a supervising physiological chemist must be added. It will be impossible to deflect anyone of the experience and rank of assistant professor in our universities to such work at a salary less than \$3,000 per year. This would seem

to me to represent the type of man to cooperate with the commission as proposed in my suggestion. A scientist of higher professional rating and ability ought to command a higher income for obvious reasons.

An expenditure of about \$25,000 for the first year is thus provided for. The estimates are based on my experience in such matters in larger researches in our laboratory, on the published budgets of the Carnegie Institution nutrition investigations, and on the experiences of the Referee Board of Consulting Scientific Experts of the United States Department of Agriculture. It must be borne in mind that there are no opportunities at Hot Springs to use the equipment of established research plants, such as universities. The cost of research may thus be raised. Such an investigation ought to give valuable indications within two years. From the standpoint of therapeutic evidence a longer collection of statistical data might be desirable.

In considering the make-up of a commission of three (or five) members in addition to the supervising physiological chemist and the medical director, I am inclined to believe that desirable individuals can be induced to serve from a sense of public duty and scientific interest, without what might strictly be termed a salary. Such individuals should, of course, receive compensation for traveling expenses, or similar outlay, together with a modest honorarium in proportion to the time required of them. The outlay thus involved is not taken into consideration in the above estimate because the amount involved will depend entirely on the plan followed. It may be noted that highly competent investigators, such as Prof. Reid Hunt, of the Hygienic Laboratory of Washington, might be directly available through the cooperation of the Public Health and Marine-Hospital Service.

Will the results be commensurate with the expenditure involved? The answer depends on the mental attitude of those who expect the reply. If a group of foremost American citizens, whose experience and judgment is attested by their position, do not hesitate to authorize the expenditure of half a million dollars for astronomical research in one institution alone, and when successful American firms feel justified in expending \$4,000 for a single page advertisement of an article of uncertain merit, shall we debate the question asked?

Finally, in reply to your tentative inquiry as to whether I would be willing to accept the appointment as physiological chemist, if it were formally tendered, I may say that my academic and research preferences and duties at present are such that I would not care to do so. If an occasion should arise in which I might be of service in some less direct way than through resident activity in Hot Springs—more specifically if I might be desired to cooperate in some advisory function—my readiness to serve might be considered.

Respectfully,

LAFAYETTE B. MENDEL.

P. S.—If a personal interview would be helpful to you in any way while you are making the preliminary plans I shall be glad to have you or other representatives meet me here or in some convenient place.

L. B. M.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., March 25, 1912.

Prof. LAFAYETTE B. MENDEL,
*Sheffield Laboratory of Physiological Chemistry,
Yale University, New Haven, Conn.*

DEAR PROF. MENDEL: I beg to acknowledge your letter of March 18, 1912, and desire to express my deep appreciation of the very careful consideration you have given to my inquiries.

All of the correspondence with reference to the proposed investigations will be forwarded to the Secretary of the Interior in due time, and I am sure that the officials of the department in Washington will appreciate your courtesy as much as I do.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 8, 1912.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

SIR: July 10, 1911, recommendation was made by this office that provision be made for a complete study of the physiological effects of the water of the hot springs. By letter from the department of December 6, 1911, I was instructed to "make due inquiry and ascertain if possible the name of some competent person to do this work and the compensation he would be willing to accept therefor." December 19, 1911, a circular letter was addressed to the secretary of the American Medical Association and to the secretaries of the leading medical colleges of the country outlining in a general way the proposed investigations, and requesting the nomination, in each instance, by an appropriate committee of the faculty, of a biological chemist of recognized standing and ability. February 20, 1912, a circular letter was sent to each of the physiological chemists, recommended by the committees of the faculties referred to, giving a more detailed outline of the general proposition, requesting an expression of opinion as to the advisability of undertaking the study and an estimate of the cost. Only a few replies have been received so far. The general plan, however, is indorsed by Prof. Otto Folin, of Harvard University; Prof. Victor Vaughan, of the University of Michigan; Prof. A. E. Taylor, of the University of Pennsylvania; and Prof. Ralph S. Lillie, of the University of Pennsylvania. The secretary of the American Medical Association has expressed much interest and referred the letter to the council on therapeutic research. Prof. Otto Folin has furnished me with a list of the members of the American Society of Biological Chemists.

The proposed undertaking is one of considerable magnitude. Such a series of investigations would require at least a year and quite possibly two or three years. A chemical analysis of the water is a simple

proposition. The study of the physiological effects involving obscure changes in the metabolism of the living body is an extremely difficult problem. It is quite within the bounds of possibility that definite results could not be obtained. It therefore appears desirable to obtain an expression of opinion from a considerable number of competent men as to the advisability of undertaking the work and the probability of its yielding scientific data that will be of real value to the medical profession and through them to suffering humanity. It is also believed that as full indorsement of the plan should be secured as possible in connection with the effort to secure from Congress the necessary appropriation.

I have accordingly prepared a circular letter, a copy of which is inclosed, with the intention, if it meets with the approval of the department, of forwarding a copy to every member of the American Society of Biological Chemists and to the professors who are occupying the chairs of the practice of medicine and of therapeutics and *materia medica* in the class A medical colleges. These are the men who are most directly in touch with the problems involved and with clinical medicine. It is believed that this plan will bring a sufficient number of replies from competent sources to settle definitely any possible question as to the advisability of undertaking the work.

As it is impracticable with the clerical assistance available to promptly conduct the correspondence involved, I have the honor to request that the department have the circular letter multigraphed and that I be furnished, for inclosure, copies of the circular of general information and the medical director's annual report.

The number of each required is as follows:

Circular letter multigraphed.....	200
Medical director's annual report.....	200
Circular of general information.....	200

There has been forwarded to the department, under separate cover, 225 letterheads for the multigraphed letter.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., ———.

SIR: The Secretary of the Interior is considering the advisability of conducting a series of experiments for the purpose of determining the physiological effects of the water of the hot springs of Arkansas. The faith of the laity in its remedial and curative properties is well established, and a steadily increasing number come to the springs each year for treatment. There are now upward of 100,000 visitors annually. Through the establishment of the office of the medical director there is now direct medical supervision over the administration of the baths and an earnest effort is being made by the Federal Government to place the medical service on a high ethical plane. As part of this general policy it is thought that a study of the physiological effects of the water is of first importance.

A complete chemical examination has been made by Prof. J. K. Haywood, of the Bureau of Chemistry of the Department of Agriculture, and by Prof. Walter Harvey Weed, of the United States Geological Survey. In 1905 the department secured the services of Prof. B. B. Boltwood and Prof. Joseph Hyde Pratt for further analysis. Their report contains the following conclusions:

- (1) The waters of the springs on the Hot Springs Reservation are all radioactive to a marked degree.
- (2) The radioactivity of the waters is due to dissolved radium emanation (a gas) and not to the presence of salts of radium or other radioactive solids.
- (3) The tufa deposited by the springs does not contain appreciable traces of radium.

A letter has been received from the secretary of the council on pharmacy and chemistry of the American Medical Association stating that the council's committee on therapeutic research has been planning to secure the cooperation of scientists for a thorough study of the therapeutic value of mineral waters, and it is also noted that at the sixty-second annual session of the American Medical Association, held at Los Angeles June 26 to 30, 1911, the following resolution was passed:

Owing to the importance attributed to radioactive mineral waters in the treatment of gouty and other affections by competent European observers and the special interest excited by the symposium on the subject at the Thirty-second Balneologic Congress recently held in Berlin, the section on pharmacology and therapeutics of the American Medical Association requests the House of Delegates to suggest to the United States Government the advisability of investigating the radioactivity of the various mineral waters of the United States and publishing the results for the benefit of the medical profession.

The arrangement contemplated by the Secretary of the Interior includes the securing of the services of a competent physiological chemist to work in conjunction with a commission of medical men. It is thought that investigations would extend over one and possibly over several years. It is believed that an appropriation from Congress can be obtained for the purpose and that the cooperation of the Medical Departments of the Army, of the Navy, and of the Marine-Hospital Service can be had, together with the facilities of the Army and Navy General Hospital at Hot Springs.

It is not desired to enter this field for commercial exploitation but to determine the legitimate therapeutic value of the water, and to secure the respect and support of the medical profession with a view to the development in our own country of a spa that will compare favorably with resorts of like character abroad.

Before requesting an appropriation from Congress for this work it is desired to obtain from competent sources an expression of opinion as to whether there is a reasonable probability that a series of biochemical investigations conducted by competent observers upon animals and upon human beings, both the sick and the well, would yield results that would be of value to the medical profession and through them to suffering humanity. In other words, is the subject a legitimate and proper one for scientific research from the standpoint of clinical medicine.

There are inclosed for your information certain reports and papers relative to the subject, and it is hoped you will favor the department

with an expression of your opinion. Should you advise that the work be undertaken, any recommendations you may be willing to submit as to the best method of procedure will be carefully considered.

Thanking you for any assistance that you may be able to render, I beg to remain,

Very truly, yours,

HARRY M. HALLOCK,
Medical Director.

THE UNIVERSITY OF ILLINOIS,
Urbana, Ill., March 21, 1912.

Dr. HARRY HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

MY DEAR DR. HALLOCK: Your communication concerning the proposition to ask Congress for an appropriation to cover the expense of an exhaustive investigation into the physiological effect of the hot springs water has just reached me.

A thoroughly scientific study of a far-reaching character of this most important topic would without doubt yield data of immense importance to the physical welfare of the citizens of our own and other countries. I was extremely gratified when the American Medical Association, in session at Los Angeles, passed the resolution to which reference is made in your letter.

The pronounced benefits to be derived from the proper use of water, both externally and internally, have not been fully appreciated by the medical fraternity, to say nothing of the laity. For a period of two to three years we have been devoting considerable time to the question of physiological effect of ingested water. Under separate cover I am sending you reprints of some of our publications. According to our data the free use of water with meals or between meals is of great benefit to the human organism from every standpoint investigated. We have also been interested in the physiological effect of baths, but have been unable to investigate the subject because of the fact that the investigations on water drinking and on fasting have demanded the major portion of the energy of myself and staff. In connection with one of our studies we made a short superficial study of hot baths, using two normal men as subjects. The data are not yet in form for publication.

I trust that you may be successful in convincing Congress of the very great need for an extended series of investigations such as you propose. I say "extended" advisedly, for you will most certainly need to investigate a large number of cases, both normal and clinical, over a considerable period of time before you will feel warranted in announcing your final conclusions. Work of this character to meet the approval of the scientific world must of necessity be done by men of proven ability. The experimental staff would of necessity be large in order to properly conduct an investigation of that character. It is my belief that a staff of 10 to 15 men with scientific or medical training would be required to investigate such a problem from all sides, e. g., clinical, bacteriological, pathological, chemical, biochemical, and physiological.

I have outlined no definite plan of procedure but have simply attempted to impress one or two matters of prime importance in the preliminary organization of such an extensive study as is proposed. My personal scientific and research interests have always occupied channels such as must of necessity be followed by your hot springs investigation, and for that reason it will give me great pleasure to be of any possible assistance to you in your attempt to interest Congress in this most worthy and humane proposition.

Very sincerely,

P. B. HAWK,
Professor of Physiological Chemistry.

AMERICAN MEDICAL ASSOCIATION,
COUNCIL ON PHARMACY AND CHEMISTRY,
Chicago, December 23, 1911.

Maj. H. M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR SIR: Dr. A. R. Craig, secretary of the American Medical Association, has referred your letter of December 19 to me. I am submitting your inquiry to the council, and it will receive very careful consideration.

It may interest you to know that the council's committee on therapeutic research has been planning to secure the cooperation of scientists for a thorough study of the therapeutic value of mineral waters.

Yours, truly,

W. A. PUCKNER, *Secretary.*

AMERICAN MEDICAL ASSOCIATION,
COUNCIL ON PHARMACY AND CHEMISTRY,
Chicago, January 19, 1912.

Maj. H. M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR SIR: Your letter of December 19 having been referred to the council's committee on therapeutic research, the chairman, Dr. Torald Sollmann, asked me to reply that it would appear impossible to make any suggestions to you until more definite information is available regarding the intended scope of the investigation. He believes that it is doubtful that the physiological effects of the waters could be determined by one individual—certainly not by a physiological chemist. It is Dr. Sollmann's opinion that it would probably require a commission working through a series of experiments extending over some years.

If the council or its research committee can give you any further aid, it will be glad to do so.

Yours, truly,

W. A. PUCKNER, *Secretary.*

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 20, 1912.

MR. W. A. PUCKNER,
*Secretary American Medical Association,
Chicago, Ill.*

DEAR SIR: Replying to your letter of January 19, 1912, in answer to my inquiry of December 19, 1911, on the subject of the determination of the physiological effects of the waters of the hot springs of Arkansas, you state—

Dr. Torald Sollman asked me to reply that it would appear impossible to make any suggestions to you until more definite information is available regarding the intended scope of the investigation. He believes that it is doubtful that the physiological effects of the waters could be determined by one individual—certainly not by a physiological chemist. It is Dr. Sollmann's opinion that it would probably require a commission working through a series of experiments extending over some years.

If the council or its research committee can give you any further aid, it will be glad to do so.

The therapeutic value of the springs in certain conditions appears to be well established by popular consensus of opinion of the many who have been benefited and by physicians who have had an opportunity to observe the effects of the use of the water. Heretofore commercialism has had an undue influence in local conditions and in the administration of the baths. Direct medical supervision was established September, 1910, by the creation of the office of medical director, and an effort is now being made to develop, along legitimate and ethical lines, whatever therapeutic resources are inherent in the waters and in the resort.

It is believed that an appropriation can be obtained from Congress for the purpose of conducting a series of experiments to determine the physiological effect of the water, and that such work could be undertaken by a commission consisting of a physiological chemist, the medical director of the reservation, the Federal registration board, all of whom are practicing physicians familiar with the use of the waters, and possibly one or more members of the county medical society. It is thought that the facilities of the Army and Navy general hospital could be obtained and possibly the cooperation of members of the medical departments of the Army and Navy, and of the Marine-Hospital and Public Health Service. It is assumed that the work would extend over a considerable period.

The most important point to determine at present is whether it is worth while to undertake this work; whether there is a reasonable probability that a study of the blood, the excretions, etc., in health and in disease, would give data as to the physiological effects and indications for the administration of the water that would be of value to the medical profession of the country and through them to suffering humanity.

There are inclosed certain reports and papers that have some bearing on the subject, and if the council or its research committee would be willing to express an opinion as to the advisability of attempting this research along the lines suggested, or on any modifications of them, their action, opinion, or recommendation would be valued highly and most carefully considered.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

AMERICAN MEDICAL ASSOCIATION,
COUNCIL ON PHARMACY AND CHEMISTRY,
Chicago, February 23, 1912.

Dr. H. M. HALLOCK,
*Hot Springs Reservation,
Hot Springs, Ark.*

DEAR DR. HALLOCK: I have received your letter of February 20 and shall transmit it to the council.

Personally, I am very much interested in the proposed investigation and I hope that the council may be of some aid in solving the problems. I will write you further as soon as the matter has received consideration.

Yours, truly,

W. A. PUOKNER,
Secretary.

HARVARD UNIVERSITY,
Cambridge, Mass., December 22, 1911.

MY DEAR SIR: Your letter of December 19, in regard to a physiological chemist to conduct some experiments with the water of the hot springs of Arkansas, has been received.

I am referring it to the secretary of the Harvard Medical School, Dr. Channing Frothingham, jr., who will, I hope, be able to recommend to you a competent man for the work.

Sincerely, yours,

E. H. WELLS.

HARRY M. HALLOCK, M. D.

HARVARD UNIVERSITY MEDICAL SCHOOL,
Boston, Mass., December 27, 1911.

Dr. HARRY M. HALLOCK.

DEAR MR. HALLOCK: Your letter of December 19 is at hand, and I have referred it to Prof. Otto Folin, our professor of biological chemistry. I feel sure that he will be able to suggest some one to you if there is anyone available around this part of the country.

Very truly, yours,

C. FROTHINGHAM, Jr.,
Secretary.

DEPARTMENT OF BIOLOGICAL CHEMISTRY,
HARVARD MEDICAL SCHOOL,
Boston, January 2, 1912.

Dr. HARRY M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: Your letter to Harvard University regarding a biochemical investigation of the physiological effect of the hot springs water has been referred to me for an answer. In my opinion it is not possible to determine the "exact physiological effects" of that water with any such degree of certainty as to meet with general and unqualified acceptance. An investigation of the kind referred to

would be very expensive and in the hands of a properly qualified and conscientious expert might yield practically negative or at least very doubtful results.

If you, after reading these comments, still believe that your department is justified in having this work done and will let me know, I will send you a list of the best men in the country qualified in the field involved.

Very truly, yours,

OTTO FOLIN.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 21, 1912.

Prof. OTTO FOLIN,
*Harvard Medical School,
Boston, Mass.*

SIR: I beg to acknowledge and thank you for your letter of January 2, 1912, with reference to the determination of the physiological effects of the water of the hot springs of Arkansas. In it you state:

In my opinion it is not possible to determine the "exact physiological effects" of that water with any such degree of certainty as to meet with general and unqualified acceptance. An investigation of the kind referred to would be very expensive and in the hands of a properly qualified and conscientious expert might yield practically negative or at least very doubtful results.

If you, after reading these comments, still believe that your department is justified in having this work done, and will let me know, I will send you a list of the best men in the country qualified in the field involved.

The therapeutic value of the baths in certain conditions appears to be well established. The faith of the laity in the curative properties of the water has steadily increased despite the unfavorable local conditions of the past, and many physicians believe that this resort is destined to become one of the great spas of the world. Before the creation of the office of medical director the medical features of the service were largely overshadowed by the commercial spirit. An earnest effort is now being made to place the treatment of patients and the administration of the baths on a high ethical plane and in developing the medical service it was thought that a study of the physiological effects of the waters should be undertaken.

A part of the general plan was to secure the services of an expert physiological chemist to conduct a series of experiments working in conjunction with a commission to consist of the medical director of the reservation, the Federal board of medical examiners, and possibly one or more delegates from the county medical society. This work would probably extend over a period of a year or more. It is believed that an appropriation can be obtained from Congress and that the cooperation of the Secretary of War, the Secretary of the Navy, and the Public Health and Marine-Hospital Service can be secured as well as such facilities as can be extended by the Army and Navy general hospital.

I am in receipt of a letter from the secretary of the council on pharmacy and chemistry of the American Medical Association stating that the council's committee on therapeutic research has been planning to secure the cooperation of scientists for a thorough study of

the therapeutic value of mineral waters, and I also note that at the sixty-second annual session of the American Medical Association, held at Los Angeles June 26 to 30, 1911, the following resolution was passed:

Owing to the importance attributed to radioactive mineral waters in the treatment of gouty and other affections by competent European observers, and the special interest excited by the symposium on the subject at the Thirty-second Balneologic Congress recently held in Berlin, the section on pharmacology and therapeutics of the American Medical Association requests the house of delegates to suggest to the United States Government the advisability of investigating the radioactivity of the various mineral waters of the United States and publishing the result for the benefit of the medical profession.

The water of the hot springs has been examined by Profs. B. B. Boltwood and Joseph Hyde Pratt, chemists, of New Haven, Conn., as to its radioactivity, and their report contains the following conclusions:

(1) The waters of the springs on the Hot Springs Reservation are all radioactive to a marked degree.

(2) The radioactivity of the waters is due to dissolved radium emanation (a gas) and not to the presence of salts or of other radioactive solids.

(3) The tufa deposited by the springs does not contain appreciable traces of radium.

The first point to determine is whether there is a reasonable probability that such a series of investigations would yield results of value to the medical profession and through them to suffering humanity. It is not desired to enter upon a fool's errand or to undertake the work with any view toward commercial exploitation, but rather to determine the legitimate therapeutic value of the water and of the resort and to obtain the respect and support of the medical profession in the development in our own country of a spa that will compare favorably with the resorts of like character abroad.

There is inclosed for your information certain reports and circulars bearing on the subject in a general way, and if after reading this more detailed explanation you are willing to advise as to whether or not the department would be justified in taking up this work you would confer a service that would be greatly appreciated.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

DEPARTMENT OF BIOLOGICAL CHEMISTRY,
HARVARD MEDICAL SCHOOL,
Boston, February 27, 1912.

Dr. H. M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: Your letter of February 21, together with the reports and circulars on the hot springs water, has thrown new light on the subject so far as I am concerned. If the facts reported by Dr. Martin are substantially correct the effects of the water constitute a legitimate and important subject for research from the standpoint of metabolism as well as from the standpoint of clinical medicine.

Before any serious metabolism work could be undertaken something in the way of a chemical laboratory would have to be arranged for. That laboratory would not need to be large and would be of permanent value, for in a place of that sort where so many sick

people come there should be facilities for making chemical examinations in connection with the treatment of patients. As such it might be made practically self-supporting. I have never been in Hot Springs and therefore have no idea as to the facilities now available. I believe that you are justified in going ahead with the work of securing an appropriation from Congress for such work. You might perhaps go ahead with greater confidence after consulting with other experts in biochemistry. I, therefore, send you a list of the members of the American Society of Biological Chemists.

So far as the actual biochemical investigation is concerned it looks to me as though it would be necessary to virtually get two men, one of high standing and recognized ability to plan and direct the work in conjunction with the commission referred to in your letter, and an assistant to stay at Hot Springs all the time till the work is finished. All the mature and recognized men hold positions which they, of course, can not give up for a temporary work like that involved at Hot Springs. There is a certain element of danger in that arrangement, too, unless the director also is required to spend a considerable time on the spot, and the assistant must be no beginner, for much will depend on his keenness and discrimination.

If I can assist you further, don't hesitate to write me again.

Very truly, yours,

OTTO FOLIN.

Dr. H. M. HALLOCK,
Hot Springs, Ark.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., March 4, 1912.

Prof. OTTO FOLIN,
Harvard Medical College, Boston, Mass.

SIR: I beg to acknowledge your letter of February 27, 1912, and desire to express my appreciation of your interest and to thank you for the assistance you have so willingly given.

In the last paragraph you state, "If I can assist you further, don't hesitate to write me again."

It is the desire of the department to have a bill introduced at the present session of Congress asking for an appropriation for carrying on the work of a commission in determining the physiological and therapeutic effects of the waters of the hot springs. The time is rather short and in all probability it will be necessary to determine the details of the work and to appoint the personnel at a later date. In order to determine the sum to be requested, however, it is necessary to have an estimate of the cost of the investigations.

I am in receipt of a letter from the department which reads in part as follows:

I have to request that you will take up the subject with the other members of the Federal registration board and submit a general outline as to the amount of money which you think should be appropriated by Congress for this purpose, such appropriation to include compensation of physicians employed, laboratory facilities, appliances, and hospital facilities in connection with the matter.

In submitting the estimate of the amount to be appropriated for this purpose a lump sum will be asked for, out of which all necessary expenses, including compensation of experts, etc., is to be paid, and it is also proposed to suggest to Congress that the Secretary of War, the Secretary of the Navy, and the Public Health and Marine-Hospital Service be authorized to cooperate with this department in handling the subject, the entire matter to be under the supervision of the Secretary of the Interior.

It would be of material assistance if you would be willing to give at least an approximate estimate as to the necessary expenditures basing the figures on the work of such a commission for the first year, and also if you could express an opinion as to the number of years that would be required to complete the work.

It is believed that hospital facilities can be obtained at the Army and Navy general hospital without cost other than the subsistence of patients. Information is especially desired as to the probable cost of the following items:

Compensation of expert.

Compensation of assistant.

Chemical laboratory equipment and operation (exclusive of building).

Number and cost of animals used for experimental purposes.

Number of healthy subjects to be employed for experimental purposes.

Number of patients to be observed.

Thanking you for any assistance you may be able to render, I am,

Very truly, yours,

HENRY M. HALLOCK,
Medical Director.

JEFFERSON MEDICAL COLLEGE,
Philadelphia, December 26, 1911.

HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR DOCTOR: Your letter of December 19, 1911, will be referred to the appropriate committee of our faculty immediately after the termination of the holidays.

Believe me, very truly, yours,

ROSS V. PATTERSON, M. D.,
Subdean.

JEFFERSON MEDICAL COLLEGE,
Philadelphia, January 8, 1912.

HARRY M. HALLOCK, M. D.,
Medical Director, Hot Springs, Ark.

DEAR SIR: Your letter of December 19, 1911, has been referred to me to name a physiological chemist.

I can heartily recommend, for the inquiry referred to, Prof. Victor Vaughan, M. D., University of Michigan, Ann Arbor, Mich.

Respectfully,

J. W. HOLLAND,
Professor of Medical Chemistry.

UNIVERSITY OF MICHIGAN,
DEPARTMENT OF MEDICINE AND SURGERY,
Ann Arbor, March 4, 1912.

Dr. HARRY M. HALLOCK,
*Medical Director, Hot Springs,
Hot Springs, Ark.*

DEAR DOCTOR: Your letter and the papers accompanying it have interested me very much. If it be true in any large number of cases that immersion of the body, or a part of the body, in water causes the body temperature to go several degrees higher than the temperature of the water, this is a most interesting question. It should certainly be investigated. I know of no other water in the world of which this is true. I have made a study of some of the great medicinal springs, such as those of Carlsbad, and I am quite sure that there is not another water in the world that does anything like this. It seems to me that the matter is of enough importance to justify a thorough and scientific investigation. I wish to make the following suggestion: It seems to me that it would be well for a medical board to be convened at Hot Springs for a period of 10 days to make a preliminary investigation, and report to the Department of the Interior as to what, in the opinion of the board, should be done. This board might consist of a few medical officers detailed from the Army, Navy, and Public Health Service. If such a thing as this is done, I should like very much to be on the board. I am a member of the Reserve Corps of the Army, and could be ordered on such service if the Surgeon General wishes. Please think this over and let me know what you decide about it. It seems to me that this would be the best way to get at it. If it is decided to undertake a thorough study, such a board as I have mentioned could map out the way in which the work should be done.

Thanking you very much, and with best wishes, I am,
Yours, truly,

V. C. VAUGHAN.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., March 8, 1912.

Prof. VICTOR VAUGHAN, M. D.,
University of Michigan, Ann Arbor, Mich.

MY DEAR PROF. VAUGHAN: I beg to acknowledge your letter of March 4, 1912, in reply to my inquiries of February 20, and to thank you for your interest and the careful consideration you have given the matter. Your suggestion as to the appointment of a preliminary board to be assembled at Hot Springs for the purpose of making a report to the department will be borne in mind. It will take some little time to arrange the details of the proposed investigations but there is one point that it is greatly desired to have settled at once, and that is the amount of money that should be requested as an appropriation by Congress for carrying on the work.

I am in receipt of a letter from the department which reads in part as follows:

I have to request that you will take up the subject with the other members of the Federal registration board and submit a general outline as to the amount of money

which you think should be appropriated by Congress for this purpose, such appropriation to include compensation of physicians employed, laboratory facilities, appliances, and hospital facilities in connection with the matter.

In submitting the estimate of the amount to be appropriated for this purpose a lump sum will be asked for, out of which all necessary expenses, including compensation of experts, etc., is to be paid, and it is also proposed to suggest to Congress that the Secretary of War, the Secretary of the Navy, and the Public Health and Marine-Hospital Service be authorized to cooperate with this department in handling the subject, the entire matter to be under the supervision of the Secretary of the Interior.

It would be of material assistance if you would be willing to give at least an approximate estimate as to the necessary expenditures, basing the figures on the work of such a commission for the first year, and also if you could express an opinion as to the number of years that would be required to complete the work.

It is believed that hospital facilities can be obtained at the Army and Navy general hospital without cost other than the subsistence of patients. Information is especially desired as to the probable cost of the following items:

Compensation of expert.

Compensation of assistant.

Chemical laboratory equipment and operation (exclusive of building).

Number and cost of animals used for experimental purposes.

Number of patients to be observed.

Thanking you for any assistance you may be able to render, I am,

Very truly, yours,

HARRY M. HALLOCK,
Medical Director.

UNIVERSITY OF MICHIGAN,
DEPARTMENT OF MEDICINE AND SURGERY,
Ann Arbor, March 11, 1912.

DR. HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR DOCTOR: In reply to yours of March 8 I will say that it would be necessary to equip and supply a laboratory. There would have to be tables, sinks, shelves, benches for balances, at least two first-class balances, at least two good microscopes, a full set of chemicals, beakers, graduates, burettes, recording apparatus, drums, in fact everything necessary for a first-class pharmacological laboratory. The research part of our pharmacological laboratory, not counting the part devoted to students, inventories about \$5,000. This of course does not include the room nor the permanent equipment of the room. I should say for laboratory purposes there should be an appropriation of about \$10,000. The director of the laboratory should have a salary of \$5,000. There should be two good assistants, each of whom should receive a salary of \$3,500. There should be two subassistants, each of whom should receive \$2,000. There should be two laboratory servants, each of whom should receive \$1,000. The cost of animals used for experimental purposes would not be less than \$500. There should be not less than 200 patients under observation, while 25 normal persons should be used for controls. I can not give you any estimate as to what this would cost. The figures that I have given,

except for laboratory equipment, of course mean annual expenditures. I think provision should be made for two years of work.

Probably this will give you enough to assist you in figuring out what appropriation you should ask for. If I can be of further service to you in this matter please consider me at your command.

Yours, truly,

V. C. VAUGHAN.

UNIVERSITY OF PENNSYLVANIA,
Philadelphia, December 22, 1911.

MY DEAR SIR: I beg to acknowledge receipt of your letter of the 19th instant in regard to experiments with a view to determining the physiological effects of the water of the hot springs of Arkansas. I shall take pleasure in referring this matter to the dean of our school of medicine, with the request that he be kind enough to make any suggestion that may be feasible in the matter.

Believe me, very sincerely, yours,

EDWARD ROBINS, *Secretary.*

HARRY M. HALLOCK, M. D.,
*Medical Director, Department of the Interior,
Hot Springs, Ark.*

UNIVERSITY OF PENNSYLVANIA,
Philadelphia, December 22, 1911.

MR. H. M. HALLOCK,
Hot Springs, Ark.

MY DEAR MR. HALLOCK: Your letter to the secretary of the University of Pennsylvania has been referred to me for reply. I would suggest to you the name of Prof. A. E. Taylor, our professor of physiological chemistry, medical school of the University of Pennsylvania. You may know of him as one of the so-called Remsen Board connected with the United States Department of Agriculture. He is at present in California, but will return in about 10 days, and a letter addressed to him at the medical school of the University of Pennsylvania will reach him within a short time. If he can not personally undertake the work, very possibly he can arrange to have it done under his direction by some of his assistants.

Very sincerely,

A. J. SMITH, *Dean.*

UNIVERSITY OF PENNSYLVANIA,
Philadelphia, February 23, 1912.

DR. H. M. HALLOCK
Hot Springs, Ark.

MY DEAR DR. HALLOCK: In reply to your communication in reference to taking up work on a commission to investigate the waters of the hot springs, it will not be possible for me to give you any reply until I know more about it. How much time would be consumed? How much time would need to be spent there? Of course, scientific results could be reached by proper investigations. If you will let

me know what would be expected I will be in a position to say whether I could be available.

Thanking you, I am, very truly, yours,

A. E. TAYLOR.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., February 28, 1912.

Prof. A. E. TAYLOR,
*University of Pennsylvania,
Philadelphia, Pa.*

SIR: Replying to your letter of February 23, requesting further information as to the proposed investigation of the physiological effects of the water of the hot springs of Arkansas, I beg to say that it is believed that it would be necessary for whoever undertakes this work to be present in Hot Springs and to devote practically his entire time to it. It is thought that the series of experiments would extend over the period of one year, and that by the expiration of that time it would be possible to determine whether it would be worth while to continue them longer. These observations would naturally be directed toward noting changes in metabolism, excretion, secretion, blood changes, and variation of vascular tension, both in the sick and in the well. The investigator would have largely to plan his own work, the object being to define if possible the legitimate therapeutic value of the water in the various forms of its administration. There is at present more or less difference of opinion on all these points.

It is desired to have the observations conducted in a way and by one whose work will be accepted by the medical profession as reliable and ethical to the general, and that we may have in our own country a spa that will compare favorably with places of like character abroad.

The first point to be determined is whether by investigations of this character it would be possible to arrive at sufficiently definite results to warrant the undertaking. The second point to be determined is an approximate estimate, as much in detail as practicable, of the cost.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

COLUMBIA UNIVERSITY,
COLLEGE OF PHYSICIANS AND SURGEONS,
New York, January 18, 1912

Dr. HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR SIR: Our faculty referred your letter of December 19 to Dr. William J. Gies, professor of biological chemistry, and Dr. Gies writes in reply as follows:

I desire to nominate Jacob Rosenbloom, M. D., Ph. D., associate in biological chemistry, as a physiological chemist competent to conduct the proposed series of experiments on the physiological effects of the water of the hot springs of Arkansas.

I assume that the work will offer such remuneration as would enable Dr. Rosenbloom to give all his time an attention to the investigation. His thorough medical training and his extended chemical experience here, and his numerous investigations of the past few years, convince me that he would be more than ordinarily competent to conduct the work to which the medical director of the Hot Springs Reservation refers in his letter of December 19, which you have submitted to me.

I trust that this answers your inquiry of December 19.

Yours, very truly,

SAML. W. LAMBERT, *Dean.*

COLUMBIA UNIVERSITY,
COLLEGE OF PHYSICIANS AND SURGEONS,
New York, December 23, 1911.

Dr. HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR SIR: In reply to your letter of December 19, I would state that your inquiry will be placed before the faculty of medicine at their meeting on Monday, January 15. Their decision will be communicated to you as soon as possible after that meeting.

Yours, very truly,

SAML. W. LAMBERT, M. D., *Dean.*

PHILADELPHIA, PA., *March 1, 1912.*

MY DEAR DR. HALLOCK: I have your kind letter. It would not be possible for me to undertake any such work as you have detailed. You have the correct plan, and I wish you success in it.

Very truly, yours,

A. E. TAYLOR.

COLUMBIA UNIVERSITY,
COLLEGE OF PHYSICIANS AND SURGEONS,
New York, March 27, 1912.

DEAR DR. HALLOCK: I have read with care and attention your communication of recent date and the documents that came with it. I am convinced that it would be in the public interest to conduct a thorough investigation on the waters in the hot springs of Arkansas. It is obvious that positive therapeutic value, if such is possessed by the waters, might be clearly established by adequate investigation. It is just as clear that lack of curative properties would be shown by proper investigations if remedial qualities were lacking. Either result would provide knowledge of public utility. Should it ultimately be decided to proceed with such work, it would give me pleasure to nominate Prof. William H. Welker, of this department, to take charge of it.

Prof. Welker cooperated with me several years ago in a research on the effects of radium after its introduction into the body, and his training as a physicist, chemist, and biologist makes him particularly competent to conduct work of the kind in the proposed research under consideration. Prof. Welker's family have for some time pre-

ferred to live in a smaller city than New York, and I am confident you would find him ready to accept appointment in this relation, providing it would make it possible for him financially to accept.

Yours, very truly,

WM. J. GIES.

UNIVERSITY OF PENNSYLVANIA,
Philadelphia, February 28, 1912.

The MEDICAL DIRECTOR, HOT SPRINGS RESERVATION,
Hot Springs, Ark.

DEAR SIR: I have your letter of February 20, informing me of the plan, lately taken under consideration by the Secretary of the Interior, of conducting a series of investigations in reference to the physiological action of the water at Hot Springs, and inquiring as to my opinion of the probable value of such an investigation and my own willingness to take part in it.

In view of the number of persons who go to Hot Springs in hope of being benefited by the baths, I am decidedly of the opinion that such an investigation should be undertaken, and conducted completely—and of course impartially—with the object simply of ascertaining what definite and demonstrable physiological effects the water is capable of producing. There is no doubt that the reports of cures, and the claims made by persons whose health has been improved while or after taking the baths, are often highly inaccurate and misleading. Post hoc is not propter hoc, and the only way of finding whether any connection exists between the properties of the water and the benefit gained by patients who undergo treatment at the springs is a scientific investigation conducted by entirely unbiased and properly qualified persons. There is no doubt that the results of any such carefully conducted investigation would be of value both to science and to the medical profession.

I am, however, not prepared to accept an appointment of the kind you describe. I am not a medical man, and I have never engaged in any investigations having a purely medical bearing, so that I feel myself unqualified to take part in an investigation of this nature. There are, however, a considerable number of physiological chemists in the country who are primarily interested in the medical applications of their science, and there would, I believe, be little difficulty in securing the services of one or more well qualified investigators.

Thanking you for your courtesy, and appreciating the honor implied in your offer, I remain,

Yours, very truly,

RALPH S. LILLIE.

COLUMBIA UNIVERSITY BIOCHEMICAL ASSOCIATION,
New York, March 14, 1912.

MY DEAR DR. HALLOCK: Your letter of the 20th just received on my return to the city from a western trip.

I think results could be obtained from the work you mention that would well commensurate with the expenditure involved. * * *

It is impossible for me to state what the work would cost without a full knowledge of the exact scope of the work.

Respectfully,

JACOB ROSENBLUM.

PENNSYLVANIA STATE COLLEGE,
INSTITUTE OF ANIMAL NUTRITION,
State College, Pa., March 20, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: I am in receipt of your letter of March 16, and in reply would say that a scientific investigation of the therapeutic value of the water of hot springs seems to me a very desirable undertaking, both as a means of increasing scientific knowledge of the general subject and as a practical measure to better utilize this natural resource.

As regards methods, I do not feel competent to make any suggestions other than the very obvious one that it is essential that the committee or commission charged with this work should be composed of men whose scientific standing and personal character will put the results of their work above criticism. If it is possible to secure such men, they would be more competent than anyone else to determine upon the methods to be followed, and if they were not competent to do this they would not be suitable members of a commission.

Very respectfully, yours,

W. P. ARMSBY, *Director.*

CATONSVILLE, MD., March 21, 1912.

Dr. H. M. HALLOCK,
Hot Springs, Ark.

DEAR DOCTOR: For more than 20 years the physiological action of certain mineral waters has been a puzzle to me. I could not explain why a carefully prepared artificial imitation of certain natural waters would not act alike, even when the natural water was not taken at the source but bottled and shipped away. The chemical analyses showed the same constituents in the same proportions, and yet I was forced to admit through evidence before my eyes that the physiological action of the waters was not identical.

The thought sometimes occurred to me that our analytical methods were not sufficient to show the presence of some agent or agents imparting such properties to the respective waters. It was, therefore, I might say, a relief to my troubled mind when, through the wonderful discovery of radium and radioactivity, a possible explanation might be found.

From these remarks you may readily draw the conclusion that I am thoroughly in favor of any steps which may lead through a scientific study to definite results.

Very truly, yours,

Dr. W. SIMON,
College of Physicians and Surgeons,
Baltimore, Md.

SHEFFIELD LABORATORY
OF PHYSIOLOGICAL CHEMISTRY,
YALE UNIVERSITY,
New Haven, Conn., March 22, 1912.

Dr. H. M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: In reply to your communication of the 16th concerning the advisability of making an experimental study of the influence of

the hot springs waters upon the body, I would say that such a procedure would be very desirable. Just at this time precisely this type of work is being carried forward in certain laboratories abroad, but they have not the opportunity or facilities that may be possible in the work proposed in your letter. The investigation would be of scientific value whatever the outcome, and in every sense is a proper and legitimate subject for research.

Very truly,

FRANK P. UNDERHILL.

THE OTHO S. A. SPRAGUE MEMORIAL INSTITUTE,
Chicago, March 22, 1912.

DR. HARRY M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

MY DEAR DR. HALLOCK: FROM what I can learn in the communications you have just sent me concerning the waters of the hot springs, it would seem most desirable that thorough investigation on the physiological action of the springs, both upon man and animals, be made under Government auspices, so that we may have unprejudiced and reliable information upon which to base future therapeutic use of the springs. It is my opinion, in reply to your direct question, that the subject is most decidedly a legitimate and proper subject for scientific research not only from the standpoint of clinical medicine, but also from that of physiology.

Yours, very truly,

H. GIDEON WELLS, *Director.*

CORNELL UNIVERSITY,
DEPARTMENT OF CHEMISTRY,
Ithaca, N. Y., March 19, 1912.

DR. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: Your circular letter of March 16 came yesterday, and I have read it with great interest and care. Prof. J. K. Haywood, of the Bureau of Chemistry, who made the chemical analysis of the water of the hot springs, is a graduate of the chemical department of this university and a personal friend of the writer. I also know the other chemists you mention in your letter, and feel sure that their reports and conclusions are reliable and valuable. Something more is required, however, than a mere chemical analysis, and I think the arrangement contemplated by the Secretary of the Interior to secure the services of a competent physiological chemist to work in conjunction with a commission of medical men an excellent one. It seems to me that the results of such an investigation would be of great value, and I am of the opinion that the work contemplated is a legitimate and proper one for scientific research from the standpoint of clinical medicine.

I would suggest that an attempt be made to get the Carnegie Institution and the Rockefeller Foundation for Medical Research interested in the matter. Dr. Benedict, of the Carnegie Institution, has been investigating problems connected with metabolism and knows more about this subject than any other man in this country.

Dr. Benedict is now in Boston, Mass., and I feel sure he would be much interested in such an investigation as you contemplate.

The Rockefeller Foundation has a very able corps of experts whose aid would be absolutely invaluable in such investigation. I have mentioned these institutions because any results published by them would command attention and be at once accepted by the medical profession. I suppose you are familiar with the work Dr. Benedict has been doing with the calorimeter, and I need not emphasize the importance of this kind of work in connection with the present investigation of the therapeutic value of these waters.

Yours, very truly,

W. R. ORNDORFF,
Professor of Organic and Physiological Chemistry.

AMERICAN CLIMATOLOGICAL ASSOCIATION,
March 21, 1912.

Dr. HARRY M. HALLOCK,
Medical Director.

MY DEAR SIR: I beg to acknowledge your very kind letter of the 18th instant, and also your very interesting report for 1911 to the Secretary of the Interior, with other inclosures.

I will reply later on to the subject referred to in your letter and as it is quite complicated I should give it consideration and see if some plan can not be outlined to afford a practical plan of investigation.

Very truly,

GUY HINSDALE.

CARNEGIE INSTITUTION OF WASHINGTON,
NUTRITION LABORATORY,
Fenway, Boston, Mass., March 21, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: I have your circular letter of March 16 with regard to investigations of the therapeutic value of the water of the hot springs of Arkansas, and I have glanced through the literature that you have sent along with this letter. There is no difficulty in determining definitely by physiological tests the action of water, provided it has any. There is a great question in the minds of experimenters as to the influence of radium emanation on metabolism, and I must confess I feel very skeptical with regard to many of the experiment reports in the literature you sent me, inasmuch as the main claim to benefit from the hot springs water is their radioactivity upon metabolism. This could only be done by persons trained in metabolic studies, particularly studying the gaseous exchange, so as to make some estimation of the actual amount of metabolic activity. Unless such a series of experiments be made, I should look very much askance at any studies undertaken. If the United States Government wishes to send to the laboratory an accredited scientist to learn the technique of making these studies, I shall be very glad to accord him what facilities we can; other than that, we are not in a position to do anything.

I am, very truly, yours,

FRANCIS G. BENEDICT.

BALTIMORE, *March 22, 1912.*

DR. HARRY M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

DEAR SIR: In reply to your letter of March 18, I would state that I believe it would be an investigation of great value to have a study made of the action of the hot springs water, not only its effects on the body in health but also in diseased conditions and its effects upon metabolism.

I believe that in order to be of any value such an investigation would have to be undertaken by a number of well-trained men, and that it would have to extend over a considerable period of time, and that an important part of the work would be to investigate the effect of the water in reference to any deleterious changes that it might cause. It seems that in certain diseases the water does harm rather than good.

I have no special suggestions at this time to make regarding the scope of such an investigation, but certainly urge that it be undertaken with the view of placing these curative waters on a scientific basis, where they certainly deserve to be.

Very sincerely, yours,

JOHN RUHRAH.

TULANE UNIVERSITY OF LOUISIANA,
New Orleans, March 25, 1912.

DR. HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR DOCTOR: I am glad to reply to your communication of March 18, but must necessarily do so in a very general way.

I have always deplored the popular estimate of hot springs in their relation to syphilis, and have considered that more harm has been done to the victims of this disease through hot springs than through any other agent in modern times. The belief of the general public in the efficacy of the water of hot springs has created the impression that one or two "courses" there was all that was needed for a cure, and you know the results.

I believe that the thorough investigation of hot springs in its relation to syphilis is not only desirable but imperative for the good of the American people and for the education of the rank and file of the profession.

It should be especially demonstrated that hot springs have advantages over ordinary hot baths or other thermal resorts, if such be the case, and I shall welcome the results of the efforts of the Government in this direction.

It will require some time to obtain the proper results, and these should be derived from systematic experiments with groups of cases not only of syphilis but of skin diseases and of those other ailments (like rheumatism, gout, etc.) which are now in the habit of being treated at the springs.

If I can be of any other service at any other time I shall be glad to serve you.

Very truly, yours,

ISADORE DYER, *Dean.*

BOSTON, *March 23, 1912.*DR. HARRY M. HALLOCK,
Hot Springs, Ark.

MY DEAR SIR: I acknowledge with thanks the receipt of your favor of March 18. In reply to your question, I would give it as my opinion that the thorough investigation into the effects of the waters from the hot springs would certainly be a legitimate and proper subject for scientific research from the standpoint of clinical medicine. It seems to me very desirable to determine what effects these radioactive waters have on healthy animals and healthy human beings. It might be desirable also to determine whether or not these effects differ from those obtained by the use of ordinary waters at the same temperature as that from the springs itself. The medical world and humanity would be the richer for the possession of this knowledge.

Very truly, yours,

J. P. SUTHERLAND.

NEW YORK CITY, *March 29, 1912.*DR. HARRY M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

DEAR SIR: Your letter of 16th instant at hand. In answer to your question I am of the opinion that a carefully conducted investigation into the various effects of radioactive waters upon metabolism would be of scientific value. But such a research would not be at all a simple one, and, in my opinion, the ordinary type of observation conducted on patients under treatment is devoid of scientific value. Only such studies as utilize the most perfect methods are worthy of consideration. These should be, in the first place, physiological, and then with these results as a basis some deduction might be made regarding pathological conditions. I should be interested in seeing such work done, but it is by no means certain that any practical result could be arrived at.

Yours, truly,

N. B. FOSTER.

BROOKLYN INSTITUTE OF ARTS AND SCIENCES,
*Brooklyn Botanic Garden, March 27, 1912.*DR. HARRY M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

MY DEAR SIR: Your letter of March 16, addressed to me at the University of Missouri, has been forwarded to me at my address as given above.

I am very much interested in the proposition to make a thorough investigation of the physiological and therapeutic properties of the waters of the hot springs. It seems to me that it is a very desirable thing to do, not only because of its scientific interest, but also because it may be the means either of protecting the public against worthless expenditure of money for treatment of no value, or be of positive benefit in demonstrating the real efficacy of the hot springs baths for certain ailments or merely as a tonic.

I should think the subject was one entirely legitimate and proper for scientific research, to be undertaken under Government auspices.

In fact, it seems to me that it is unfortunate that such an investigation has been so long delayed, in view of the fact that so many people have been led to look for relief and have spent considerable sums of money in that direction at the hot springs.

I believe the investigating staff should include a physiological chemist, a physical chemist, and a practicing physician, and the data gotten together ought to include information with reference to the history of past treatments, with their success or failure for different diseases, not only at these springs, but also by comparison with similar springs abroad.

Undoubtedly, if a competent force of investigators was appointed, the details of the investigation could very properly and advantageously be left to them.

I should be very much interested to know what further steps are taken in this matter, and if I can in any way render any service in this connection I shall be more than glad to do so.

Thanking you for the courtesy of addressing me on the subject, I am,

Yours, very sincerely,

C. STUART GAGER.

ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH,
New York, April 2, 1912.

DR. HARRY M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: Your favor of the 16th was received, and, with the accompanying paper, read with interest. The striking physiological properties of the hot springs assuredly deserve a thorough investigation. For that I can suggest nothing better than the assignment of a properly equipped physiological chemist from the Department of Agriculture or the Public Health and Marine-Hospital Service, to remain on the work until it has been completed to a satisfactory degree.

Yours, very truly,

DONALD A. VAN SLYKE.

CHICAGO, *March 27, 1912.*

DR. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation, Ark.

DEAR DOCTOR: I would say in reply to your inquiry that I am heartily in sympathy with the proposed investigation, under the auspices of the United States Government, of the physiologic effects of the waters of the hot springs of Arkansas. Am convinced that our national resources, climatic as well as balneologic, do not receive the attention and the study that they deserve.

Investigation conducted by persons commercially interested in a health resort are hardly likely to be of great scientific value, as personal bias can not be eliminated even by good intentions. Such investigations should be conducted by the Government, and the results, good or bad, published for the benefit of the people.

Thanking you for the opportunity to express my opinion in this matter, I am,

Yours, very truly,

BERNARD FANTUS, M. D.

WINNIPEG GENERAL HOSPITAL,
Winnipeg, March 25, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR DOCTOR: In reply to yours of March 16, I am much gratified that the effort is at last being made to put America's best-known spa on a scientific basis, as the taint of the Diamond Joe régime has probably been the greatest drawback the hot springs have ever had, and they have not been permitted to do the good of which they are capable. It would be of great value to the profession of the country if they could have a definite and reliable statement of the actual therapeutic value of the springs. While we know, of course, that the bulk of the good results of the foreign springs rests on a more or less scientific basis, the present-day developments of radiotherapy indicate that if these springs are really endowed with radioactivity they may become of great value.

As to the method of investigation. Your letter suggests a physiological chemical investigation. I assume that this term is used in its broad application to include pharmacology and experimental therapeutics, as it is with mineral waters particularly that physiological chemistry, or any chemistry alone, is extremely liable to lead us astray, the only thing of any great reliability being actual animal experimentation, followed by definite experimental therapy, for which I suppose the hospital would furnish sufficient material, after the animal experiments had suggested promising lines of procedure.

If I can at any time be of service, I will be pleased to do so, not the least for the reason that while I am now under the British flag I still hold my commission in the M. R. C.

Yours, respectfully,

W. P. MORRILL, M. D., *Superintendent.*

MADISON, WIS., March 19, 1912.

Dr. HARRY M. HALLOCK,
Medical Director, Hot Springs Reservation,
Hot Springs, Ark.

DEAR SIR: Yours of the 16th instant at hand. I would state to begin with that I am hardly qualified to answer authoritatively the questions asked. Reports of the work done abroad in determining the effects upon metabolism of radioactive baths and drinking waters does not seem to offer great encouragement in this field. A number of such investigations have been carried on, the reports of which have been published in the *Zeitschrift für Experimentelle Pathologie Und Therapie* during the last few years. Very little, if anything, tangible has been found to indicate any deep-seated or definite effect upon metabolism. My own impression, therefore, is that much time might be wasted in such investigation. On the other hand I should hesitate to express a positive opinion which might in the slightest degree discourage research along any line. This line seems so much less promising than many others in the field of preventative and curative medicine that I should personally prefer to see the Government appropriate money for more valuable lines of investigation. * * *

I believe it is generally conceded that the cures effected by the well-known spas of Europe are to be attributed to the out-of-door life enjoined on the patients, to the regular regimen of diet and sleep and exercise; to the simple, nutritious food provided, rather than to any inherent property of the waters themselves. It is possible, however, that these radioactive waters may prove beneficial in certain types of skin diseases.

Very truly, yours,

H. C. BRADLEY.

NOTE.—Harold C. Bradley, assistant professor of physiological chemistry, department of physiology, University of Wisconsin.

UNITED STATES DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
Washington, D. C., March 27, 1912.

DR. HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR SIR: Your letter of March 16 was received, together with the additional data regarding the Arkansas hot springs. I am much interested in the subject and in the plans for future development. Without doubt biochemical studies of the effects of the waters would prove valuable.

In my judgment, it is also important to study the effect of food conditions in combination with the waters. A number of years ago an attempt was made in connection with the nutrition investigations of this office to compile experiments with men and animals in which the balance of income and outgo was determined usually in terms of nitrogen. As the work progressed it became evident that a very large number of studies had been made in which the effects of mineral waters and baths of different sorts and similar factors had been studied.

A considerable number of the articles abstracted were published in Russian, and others in French and German. Many additional reports have appeared since our bulletin was published, and it may safely be said that the total amount of literature existing on this subject is fairly large. In my opinion, this material might be very profitably collected and digested as a preliminary to and in conjunction with other studies, the Arkansas springs.

It might be possible to arrange for cooperation between your bureau and the Office of Experiment Stations, for such a project, should you think favorably of it.

Trusting that it will prove of interest to you, the Division of Publications has been asked to mail you under separate cover a copy of Bulletin 45, of the Office of Experiment Stations, Dietary Studies in New York City in 1895 and 1896, which contains a summary of the data referred to above, and also a number of our general publications on food and nutrition topics.

Very truly, yours,

C. F. LANGWORTHY,
Chief of Nutrition Investigations.

NEW YORK, *March 23, 1912.*Dr. H. M. HALLOCK,
Medical Director.

DEAR DOCTOR: Your letter of the 15th instant has given me great satisfaction in that it is in line with efforts I have been making for a long time to study the scientific and practical aspects of our abundant and numerous mineral waters. The latter, having been so long exploited by commercial enterprise, have fallen into desuetude because physicians have not observed the therapeutic results they had reason to expect from the too often false representations of advertisers and promoters. Moreover, medical men at some of these springs, being in the employ of or at least dependent for patronage upon the proprietors of the springs, have not been as frank as was their real desire, in dissuading persons whose cases were not adapted to the waters of their particular resort from remaining. This is one reason for my hearty approval of the scientific investigation of the waters of Hot Springs and their clinical application under unbiased and skilled supervision. This may seem a singular reason, but I am convinced that if the definite and reliable results that surely will accrue from the investigation you propose will stimulate other spring owners to follow your example, the result will be the same splendid one which has been achieved by the demonstrations of the Department of Agriculture to our farmers. Every good health resort will emulate your example, and there will ensue a renaissance in physical therapeutics which I have been in vain endeavoring to initiate. So far my result has been mainly to convince intelligent physicians that there is a physiological action of water which has not been sufficiently studied and that water may be applied therapeutically with success only upon the same physiological basis as digitalis or strychnia or other medicinal agents. Prior to the discovery of the effect of radioactivity in mineral waters, I have based all hydrotherapeutic action on the thermis, mechanical, and (feeble) chemical excitation of the cutaneous nerve and vascular supply when used externally. In my article on "Mineral springs," in the first edition of Hare's *System of Practical Therapeutics*, I stated that "it is more important for the physician who sends a patient to the springs to know the mental composition of the doctor than the chemical composition of the water." Little confidence have I had in the latter. If radioactivity may be added to the feeble and often inert chemical constituents which are the boast of most of the springs, their therapeutic value will surely be vastly enhanced. I heartily indorse the plan contemplated by the Secretary of the Interior of securing the services of a competent physiological chemist to work in conjunction with a commission of medical men.

I am convinced that there "is a reasonable probability that a series of biochemical investigations on animals and human beings, both the sick and the well, would yield results that would be of value to the medical profession, and through them to suffering humanity." The whole subject is of great promise from a clinical standpoint. Not having received the inclosures you refer to, I am not prepared to give you suggestions. I need not say that you will need physicians who have more than an academic acquaintance with hydrotherapy. Indeed, I discussed the subject of your letter two summers ago with

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
Hot Springs, Ark., March 25, 1912.

Prof. ELBERT W. ROCKWOOD,
*Department of Chemistry, State University of Iowa,
Iowa City, Iowa.*

DEAR PROF. ROCKWOOD: I beg to acknowledge your letter of March 18, 1912, and to express herewith my appreciation of the consideration you have given to my inquiries.

All of the correspondence with reference to the proposed investigation will be forwarded to the Secretary of the Interior in due time, and I am sure that the officials of the department in Washington will appreciate your courtesy as much as I do.

Very respectfully,

HARRY M. HALLOCK,
Medical Director.

CHICAGO, *March 20, 1912.*

HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

SIR: I have your letter of March 16, 1912, containing a statement of the governmental control of Hot Springs Reservation and also your report to the Secretary of the Interior for 1911 and a copy of the publications on the hot springs of Arkansas.

I think that further investigations, biochemical and clinical, should be made of the waters of Hot Springs, Ark. In my opinion the subject is a legitimate one and a proper one for scientific research for the purpose of making more practical the uses of the waters for patients.

I wish that it were possible for the Government to more fully control the uses of the waters by patients. If it were possible for the Government to cut out all outsiders and to conduct the bathing pavilions under complete governmental control, I believe it would remove many of the objections which now exist there.

I appreciate very much what the Government has already done through the officials to remove and correct as far as possible the former abuses which came through private interests of all kinds.

Very truly, yours,

FRANK BILLINGS.

NOTE.—Frank Billings, dean Northwestern University Medical School; professor of practice of medicine, Rush Medical College; professor of medicine, University of Chicago.

CHICAGO, *March 19, 1912.*

Mr. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

MY DEAR SIR: I strongly urge that tests be made to determine the chemical, thermal, and radioactive variations of the waters of Hot Springs, Ark., for this is knowledge which the medical profession needs. More than that, I urge that a physiologist of experience be given facilities for determining the effects produced by the spring water

when taken internally and when used for bathing. Unless the profession has this knowledge, the water can not be used in a scientific way. Something is known of its usefulness, but it is prescribed empirically not because it is known why it should be used.

I hope the United States Government will make these investigations. Not only will they be valuable for the development of the usefulness of this spring, but doubtless much will be learned which will be useful in applying other spring waters.

Very respectfully, yours,

N. S. DAVIS.

NOTE.—Nathan S. Davis, A. M., M. D., professor of principles and practice of medicine, Northwestern University, Chicago, Ill.; ex-president Chicago Medico-Legal Society; member American Medical and American Climatological Associations, etc.

ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH,
New York, March 27, 1912.

DR. HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR SIR: Your letter of March 16, with the printed matter, was forwarded to me. I should be glad to be of assistance to you, but I know so little about the effects of springs on health that I am not in a position to make a definite statement or recommendation.

Thanking you for your note, I remain,

Yours, very truly,

JAMES LEE.

ALBANY, N. Y., *March 25, 1912.*

HARRY M. HALLOCK, M. D.,
Washington, D. C.

MY DEAR DOCTOR: Your letter and reports concerning hot springs of Arkansas were duly received, and, while I do not claim to have any very expert knowledge of such matters, it seems to me that there can be little doubt that such an investigation as you propose would be of the greatest value in determining in what class of cases they could be resorted to with advantage. As in many other cases it is not possible to tell beforehand in precisely what way they may turn out to be of the greatest use.

Very truly, yours,

SAML. B. WARD.

CORNELL UNIVERSITY MEDICAL COLLEGE,
New York, March 20, 1912.

DR. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: Replying to your note of March 16 regarding the possible value of careful investigations with regard to the value of the baths of Hot Springs, Ark., I would say that I heartily approve of the idea. Of course the value of such work would depend upon the training of the head chemist who had the matter in charge. There is so much that is published nowadays which is not properly controlled that it would be a great misfortune unless the work were conducted by a

man whose knowledge of the problems to be attacked was of the most thorough and fundamental order. The recent work in Germany with regard to the value of radium emanations upon the destruction of uric acid in the body is of great suggestiveness, and it would be well if similar work could be done in this country, if placed in the hands of competent observers.

Very truly, yours,

GRAHAM LUSK.

NOTE.—Graham Lusk, Ph. D., Sc. D., F. R. S. (Edin.), professor of physiology, Cornell University Medical College.

AMERICAN MEDICAL ASSOCIATION,
COUNCIL ON PHARMACY AND CHEMISTRY,
Cleveland, Ohio, March 25, 1912.

Dr. H. M. HALLOCK.

DEAR SIR: I have perused your letter to the council and to me, and also the printed matter, with interest. It appears to me that an investigation by a physiological chemist, working in conjunction with a medical commission, holds forth promise of considerable usefulness. This investigation might bear on the following problems: Effect on temperature; effect on metabolin; effect on excretion of water, salts, metabolites, and drugs (Hg. iodid, plumbism, etc.); effect on circulation; effect on blood.

These observations will be made on healthy and diseased subjects. Comparative experiments should be made with the hot and cooled waters, also with ordinary hot water, and with the springs and plain water taken internally.

If some such program is submitted to the prominent laboratories where biochemical researches are in progress, it might facilitate the obtaining of the properly qualified investigator.

Very truly, yours,

TORALD SOLLMANN.

BUREAU OF ANIMAL INDUSTRY,
Washington, D. C., April 1, 1912.

Director HARRY M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: I have your circular dated March 16. In reply to your question "Is a biochemical investigation * * * of the waters * * * a legitimate and proper one for scientific research from the standpoint of clinical medicine?" I beg to answer, in spite of my limited knowledge of the physiological effects of radium and its products, yes; provided, however, that those who are in charge of the investigations realize that the most skillful physiological chemist working for a few years probably will not get results that will appeal strongly to anyone except scientists interested in just that line. I mean that I doubt whether practical results can justly be expected from one man working a few years. I believe that before results of a direct clinical value are obtained many men will have worked for many years.

If a biological chemist were engaged in research at the hot springs, a very grave injustice might be done to him if he were regarded as

incompetent because "practical results" were not forthcoming. I believe that the work should certainly be done—the more biochemists, the better—but let there be no expectation of anything definite for about 10 years. This is not too long. I used radium bromid (and barium bromid) in some metabolism experiments on dogs, and one of the results was to point out the endless labor and difficulty involved in working out the physiological and pharmacological action of a substance like radium or its allied products.

Permit me to emphasize the desirability of the work and the length of time it will probably take to arrive at results that are of "practical value."

Respectfully,

WILLIAM W. BERG.

APRIL 2, 1912.

DR. HARRY M. HALLOCK.

MY DEAR DOCTOR: I most heartily indorse the efforts you are making to have tested the therapeutic value of the waters on the reservation. There seems every reason for believing that these waters will prove as beneficial, if not more so, than those in European countries.

If I can aid you in securing the necessary appropriation by speaking to a few Members of Congress I will cheerfully undertake the task.

Very truly,

SAMUEL S. ADAMS,
Georgetown University.

NOTE.—Samuel S. Adams, A. M., M. D., professor of theory and practice of medicine and diseases of children, Georgetown University.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
Washington, D. C., March 20, 1912.

DR. HARRY M. HALLOCK,
Hot Springs, Ark.

DEAR SIR: I beg to acknowledge the receipt of your letter of March 16, together with the inclosures. I will give the matter my very best consideration and will communicate with you again as soon as I have opportunity to read the literature you sent me and to consider the whole question. I hope that you can give me a few days in which to turn the matter over in my mind. It is certainly of such importance as to warrant earnest thought. Moreover, while I am familiar with the literature of radioactivity in a general way, I wish to refresh my memory by reading again some of the recent work on the subject. In that way I hope I will be able to give you an opinion that will be worth more than if I should reply to your question at once. If, however, it is necessary for me to reply at once please do not hesitate to say so and I will do what I can under the circumstances. You will then hear from me again in the course of some days.

Very truly, yours,

CARL L. ALSBERG,
Chemical Biologist.

CHICAGO, April 6, 1912.

Dr. H. M. HALLOCK,
Hot Springs, Ark.

MY DEAR DR. HALLOCK: In answer to your circular letter of March 15 regarding the scientific investigation of natural mineral waters, I would say that such investigations under Government supervision would undoubtedly be of enormous value to the people of this country, and that the value would gain in importance by having the work conducted jointly by the Government and a committee of the American Medical Association, because this would insure the transmission of such results directly to the entire medical profession and through them to the public.

Yours, very sincerely,

A. J. OCHSNER,
*Professor Clinical Surgery of the Medical Department
of the University of Illinois.*

NEW YORK, April 4, 1912.

HARRY M. HALLOCK, M. D.,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR DOCTOR: Please accept my thanks and appreciation of your letter of March 14 and my apologies for the delay in answering the same.

I have been greatly interested to hear of the plan of instituting investigations of the physiological effects of the waters of Hot Springs. It is not so very long that attention has been directed to the radioactive qualities of European mineral springs, and the study of the subject is far from completed. Therefore there seems to be no doubt that biochemical investigation, conducted by competent observers, of the action of the waters of hot springs upon animals and upon human beings, both the sick and the well, at the springs, would result in the production of valuable scientific information beneficial to the medical profession in general and indirectly to suffering humanity. Such investigations conducted by officers of the United States Government would command attention in this country as well as abroad, and would certainly be welcomed from the clinical standpoint.

American mineral springs have heretofore been woefully neglected by the medical profession as well as by the American people. Meeting the request of the committee on therapeutic research of the American Medical Association for an investigation of the radioactivity of the various mineral waters, the plan indicated in your letter would undoubtedly be welcomed and supported by the physicians of the entire country and largely contribute to a more general appreciation of our domestic watering places.

Under these circumstances it is to be hoped that Congress will make a sufficiently large appropriation for the purposes of such an investigation.

Very truly, yours,

HERMAN G. KLOTZ, M. D.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., April 11, 1912.

Dr. H. M. HALLOCK,
Hot Springs Reservation, Hot Springs, Ark.

DEAR SIR: I have your letter of March 16 concerning the physiological effects of the water of Hot Springs, Ark.

I am interested in what you write and believe that if the matter can be arranged satisfactorily a thorough investigation of the physiological effects of the waters would be of value. I have shown your letter to Prof. R. B. Moore, recently of Butler College, Indianapolis, and now of this bureau, who has published some work on the radioactivity of waters of this country, and he informs me that he is quite well acquainted with the work you quote of Prof. B. B. Boltwood, and that the statement No. 3, "The tufa deposited by the springs does not contain appreciable traces of radium," is not correct. At the time that Prof. Boltwood did this work the methods of detecting small quantities of radium were not as far advanced as they are at the present time. Prof. Boltwood's work on the radioactivity of the waters is reliable, but more recent investigations of the tufa by Prof. Schlundt, of the University of Missouri, has disclosed the fact that some of the tufa is exceedingly active; in fact, in one case the sediment in a spring is one of the most radioactive in the whole world. Therefore, before drawing any conclusions regarding the therapeutic value of the waters, it might be advisable to have the investigation as regards the radioactivity still further extended.

Mr. Moore is now in the Government service in connection with the Bureau of Soils. I am sure he will be glad to give you any advice or suggestions that you may desire in connection with this matter or in connection with the resolution adopted by the medical association at Los Angeles that the Government take up the investigation of the radioactivity of the various mineral waters of the United States.

Yours, very truly,

OSWALD SCHREINER,
In Charge.

NEW YORK UNIVERSITY,
UNIVERSITY AND BELLEVUE HOSPITAL MEDICAL COLLEGE,
New York City, April 17, 1912.

HARRY M. HALLOCK, M. D.,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR SIR: Your circular letter addressed to me at the Albany Medical College was forwarded to me at my present address above.

I deem it extremely wise and would recommend by all means that an investigation as to the therapeutic value of the waters at the hot springs be made with scientific accuracy and under competent supervision.

The exploitation of so many spas where remedial waters are dispensed at high cost both for services and living has had its effect upon the profession as well as the laity, and it is therefore, above all things, highly necessary that you become able to present scientific proof of the functional efficacy of the spring water.

It would be impossible to give you an outline of a possible line of procedure, for that would entail months of study into the conditions of climate, composition of water, methods of ingestion, physiological effects, etc.

I can simply call your attention to the importance which has quite recently been emphasized from various standpoints of the equilibrium of salts which must exist and be held constant in the full-grown individual and the abnormalities of function which result from any disturbance of this equilibrium. Also the importance of certain salts, such as potassium compounds, for the proper growth of the young. All this is apart from the question of the therapeutics of radioactive substances. Any data which you may obtain in any of these fields will be of great value to the medical profession and would result in increased cooperation on their part.

Very truly,

HOLMES C. JACKSON.

P. S.—If you are actually anxious for details in any specific matter I shall be glad to supply them.

COLLEGE OF MEDICINE OF SYRACUSE UNIVERSITY,
Syracuse, N. Y., April 18, 1912.

DR. HARRY M. HALLOCK,
*Medical Director, Hot Springs Reservation,
Hot Springs, Ark.*

DEAR SIR: Your letter of March 16, addressed to Dean Heffron, has been handed to me, with the request that I make a reply. I am in hearty sympathy with any attempt which leads to estimating the exact physiological effects of the water at Hot Springs. I believe that you are to be congratulated because of the fact that the Government is taking hold of this spa, and I consider it one of the duties of the Government to not only make the springs accessible to the people, but to so study them that the baths and water will be used only in a perfectly proper way.

Very truly, yours,

W. D. ALSEVER,
Professor of Therapeutics.

THE UNIVERSITY OF WISCONSIN,
DEPARTMENT OF PHARMACOLOGY AND TOXICOLOGY,
Madison, Wis., April 24, 1912.

DR. HARRY M. HALLOCK,
Medical Director, Hot Springs, Ark.

DEAR SIR: Due to serious illness in my family and my absence from the city, I have been unable to answer your letter earlier. I think a thorough study of the physiological effects of the water of hot springs and a determination of its therapeutic value would be very desirable. I can not make any recommendations "As to the best method of procedure," because I do not understand what you mean by this phrase. Scientifically, the work should determine the effect of the water on metabolism in health and disease, and physiological investigations of various kinds should determine the effect in detail of the water on the circulation and respiration in health and disease.

Yours, very truly

A. S. LOEVENHART.

RULES AND REGULATIONS, WITH ALL AMENDMENTS THERETO, UP TO AND INCLUDING JUNE 30, 1912, FOR THE GOVERNMENT OF ALL BATHHOUSES RECEIVING HOT WATER FROM THE UNITED STATES RESERVATION AT HOT SPRINGS, ARK.

The superintendent of the Hot Springs Reservation is directed to enforce a prompt and faithful compliance with the following rules:

RULE 1.—Bathhouses or hotels will be allowed such number of tubs as the Secretary of the Interior may, in his discretion, deem proper and necessary for the public service and as the amount of hot water will justify.

RULE 2.—The constant flow of hot water for vapor or other baths, even during business hours, or the unnecessary waste of water in any manner, is strictly prohibited, and will, if continued after written notice from the superintendent to stop such waste of water, be considered by the department sufficient grounds for the cancellation of the lease of such offending lessee.

RULE 3.—Rentals must be paid quarterly, in advance, at the office of the superintendent, and if not paid within five days from the beginning of each quarter the supply of water may be cut off.

RULE 4.—The charge for baths at the different bathhouses shall be at the rates fixed by the Secretary of the Interior, and no bath tickets shall be sold for more than said rate, and then only to such persons as intend to actually use them for bathing. The rate or rates so fixed for baths shall include, without extra charge, the supplying of each bather with one clean sterilized sheet to envelop the body of the bather while in the bath hall and cooling room. In event of charges in a less amount being exacted for baths, such new rate shall at once be reported to the superintendent, and, when approved by the department, shall thereafter become the maximum rate. No bath ticket shall be sold except at the office of the bathhouse where the bath is to be given, and tickets must show the date when issued, the serial number, the number of baths for which issued, the full name of the purchaser, and the amount paid therefor. Bath tickets shall be redeemable for the same proportionate price for which they were sold, when presented by the original purchaser: *Provided*, That when less than seven baths have been taken on any ticket presented for redemption the bathhouse may charge the rate for single baths for the number of baths taken on said ticket. No bath ticket or part of a ticket shall be reissued after having been redeemed. No bathhouse receiving water from the Hot Springs Reservation will be permitted to issue complimentary bath tickets, except that bathhouse lessees may, on written permission of the superintendent, issue complimentary bath tickets in such cases as in his judgment justify such action. The renting and selling of bath robes, towels, soap, toilet articles, or articles of merchandise in bathhouses is prohibited.

RULE 5.—The owners or managers of bathhouses receiving waters from the Hot Springs Reservation are prohibited from bathing in said bathhouses persons stopping at any hotel, boarding house, or rooming house which has a drummer or solicitor on trains or the owner of which drums or solicits on trains, or who has employed in or about such house any inside man or person engaged in drumming or soliciting business for doctors or bathhouses; also the owners or managers and the employees of such bathhouses are absolutely prohibited from either directly or indirectly reflecting on or questioning

the integrity of the hot-water supply of any other bathhouse, or of claiming superiority of its own supply of hot water over that furnished from the springs on the reservation to other bathhouses. Upon evidence of violation of this rule the superintendent shall report the facts, with his recommendation, to the Secretary of the Interior, looking to the shutting off of the water from any bathhouse or canceling the lease, as the department may determine.

RULE 6.—Owners and managers of bathhouses receiving waters from the Hot Springs Reservation will provide in their respective bathhouses the requisite number of head bath attendants, who, under the supervision and direction of the medical director of the Hot Springs, shall supervise the administration of baths, the treatment of patients, matters of hygiene and sanitation in the bathhouses, and the work of bath attendants generally. Bathhouse attendants shall be allowed to charge for their services not exceeding 15 cents for a single bath, \$1 per week, or \$3 per course of 21 baths, to be collected for the attendant by the bathhouse manager and properly accounted for by him to the attendant. The duties of the attendants shall consist in the administration of the baths in strict accordance with the bathing directions of registered physicians and in lieu of these as ordered by the medical director. They shall be required to clean and care for such parts of the bathhouse as may be assigned them by the manager, subject to the approval of the medical director, to keep themselves in a neat and cleanly condition both in person and in dress, and to make good any damages accruing from breakage or neglect of duty. They shall not be required to handle helpless individuals, rub mercury, furnish mops, brooms, or cleaning materials, furnish or launder towels, mitts, sheets, or robes; pay for the services of the porter or perform work which properly belongs to him, or incur any expense whatsoever incident to the operation of the house not specifically authorized. It shall be optional with the bather whether he employ an attendant or not. No person shall be employed or permitted to serve or occupy space in any bathhouse as a mercury rubber or as a masseur without the approval of the medical director first had and obtained; and every person so employed or serving shall be subject and amenable to the rules and regulations the same as attendants and other bathhouse employees.

RULE 7.—The payment of any sum of money or anything of value, either directly or indirectly, by any bathhouse owner, manager, clerk, or attendant as compensation for drumming customers to any bathhouse, or allowing public drummers, drumming doctors, hotel or boarding-house proprietors who are drummers, or persons who work with them as inside men, to bring persons or show them through, or to loiter in or about any bathhouse, is positively forbidden. Upon evidence of violation of this rule, the superintendent shall report the facts, with his recommendation, to the Secretary of the Interior, looking to the shutting off of the water from any bathhouse or canceling the lease, as the department may determine.

RULE 8.—The lessee of each bathhouse shall cause to be kept a full and correct daily register of each bath given, the number and kind of bath tickets sold, and the number of complimentary tickets, if any, issued each day, etc., such form of register to be approved by the superintendent and a copy therefrom of each day's business to be forwarded to the superintendent daily. No person shall be allowed

to bathe without a numbered ticket being issued and a record of the same being kept, and report thereof duly certified by the manager filed with the superintendent on the first day of each month as paid, complimentary, or free baths, together with any information he may have showing a violation of the bathhouse rules and regulations which may be susceptible of proof.

RULE 9.—All bathhouses receiving deposits of jewelry, money, or other valuables from bathers must provide means satisfactory to the superintendent of the reservation for the safe-keeping thereof; it is to be understood, however, that the Government assumes no responsibility in the premises. All losses must be promptly reported to the superintendent by the bathhouse manager.

RULE 10.—An applicant for baths who is under medical treatment shall not be permitted to bathe in any bathhouse supplied with hot water from the Hot Springs Reservation, unless said applicant presents satisfactory evidence that he or she is the patient of a physician who is duly registered at the office of the superintendent as qualified to prescribe the waters of the hot springs, and who is known not to engage in drumming for custom: *Provided*, That every applicant for baths, not under the care of a registered physician, shall be required to make a certificate to be filed with the bathhouse manager that he or she is not under the care of any physician, and should such applicant subsequently employ, consult, or take treatment from any physician while taking baths, then in such case he or she will immediately notify the bathhouse manager of such fact. The violation of this rule by the owner, manager, or any employee of a bathhouse receiving hot water from the reservation will result in the cutting off of the water from the bathhouse or the canceling of the lease, as the department may determine.

RULE 11.—Physicians desiring to prescribe the waters of the hot springs, either internally or through the medium of baths, must first be registered at the office of the superintendent of the reservation, and shall use only such uniform form of bathing directions as meet with the approval of the superintendent. Registration will be accorded only to such physicians as are found, by a board designated by the Secretary of the Interior, to have proper professional qualifications and character and who do not engage in drumming for custom. No physician who shall engage in the solicitation of patronage through the medium of drummers or otherwise, or who shall engage in unprofessional, disreputable, or dishonest conduct, or is addicted to the drug or other habit which disqualifies him for the performance of his professional duties, shall be or remain registered. In case any person who, in violation of these regulations, bathes or attempts to bathe, or enters or attempts to enter upon the Hot Springs Reservation to bathe, shall have the permit of a physician therefor, such physician shall be liable to the penalties provided in the act of April 20, 1904, unless he is regularly registered, but the bather or the person attempting to bathe shall not be liable to the penalties of said act unless it shall be made to appear that he knew or had reason to believe that the physician giving him the permit to bathe was not regularly registered. The management of any bathhouse will not be allowed to permit persons not under treatment by registered physicians to bathe unless they present tickets from the superintendent of the Hot Springs Reservation authorizing the holders thereof to use

the hot waters. The names, number and street where stopping in Hot Springs, and the home addresses of the holders of such tickets must be registered in the office of the superintendent and by the management of the bathhouse, and on or before 12 o'clock a. m. of the day next succeeding the one on which the tickets were used the management of the bathhouses must return all such tickets to the superintendent.

RULE 12.—If a charge is made to the superintendent in writing, under oath, supported by the affidavits of two or more witnesses, that a registered physician has violated any of the laws or regulations pertaining to the government of the bathhouses receiving hot water from said reservation, the registered physician against whom the charge is made shall be immediately notified by the superintendent of the fact that affidavits have been made and be accorded an opportunity to cross-examine the witnesses on the subject thereof, in the presence of the superintendent, and the affidavits so filed, with the answers to such interrogatories as may be propounded by the physician, when completed, shall be duly certified by the superintendent and turned over to the Federal registration board, and thereafter, if in the judgment of the board the facts warrant such action, they will immediately cite the physician to appear before such board on a day to be named, within not exceeding 10 days from date of notice, to show cause why his name should not be stricken from the register of physicians authorized to prescribe the hot waters of said springs, and pending the investigation and final action upon such charges the right of such physician to prescribe the hot waters may be suspended by the Federal registration board, with the approval of the Secretary. The physician against whom such complaint is made shall have the right to file further written interrogatories pertinent to the issue to such complainants or witnesses, to be answered by them under oath, and may submit within 20 days thereafter counter affidavits in answer to the charges made in the affidavits of said witnesses.

The complainant witnesses may file rebuttal affidavits within 10 days after the service upon them of said counter affidavits, and the hearing of said charges shall be had on the record aforesaid. An appeal from the decision of said board and upon said record may be taken within seven days from such decision to the Secretary of the Interior.

If upon consideration of the complaint the charge is not sustained, the suspension will be immediately removed. If, however, such charge is sustained, or if default be made, the name of the physician shall be stricken from the registered list.

RULE 13.—Persons violating any of the foregoing regulations within the purview of the act of April 20, 1904, entitled "An act conferring jurisdiction upon United States commissioners over offenses committed in a portion of the permanent Hot Springs Mountain Reservation, Arkansas," and the act of March 2, 1907, amendatory thereof, will be deemed guilty of a misdemeanor and be subjected on conviction to the payment of a fine, as provided in said act of April 20, 1904, of not exceeding \$100, and be adjudged to pay all costs of the proceeding.

RULE 14.—All bathhouses shall be kept in a neat, clean, and sanitary condition, and all sewage and waste water properly conducted

away, and all underdrainage kept in perfect order. The water-closets shall have sufficient and free connection with the public sewers and be kept in the best order and with the best plumbing furnishings and appliances. Lessees of bathhouses on the permanent reservation shall, under the direction of the superintendent, cultivate and maintain a part of the bathhouse park in front of their respective bathhouses, the space for each to cultivate to be allotted by the superintendent.

RULE 15.—Each bathhouse manager, clerk, and attendant shall be required to have a full and complete understanding of the bathhouse rules and regulations before entering upon his duties.

The superintendent is authorized to require the discharge of any bathhouse manager, clerk, attendant, mercury rubber, or masseur for bathhouse drumming or refusing or neglecting to carry out the bathhouse rules and regulations according to the true intent and meaning thereof. Any person discharged for cause from a bathhouse or removed at the request of the superintendent shall not be again employed by the same or any other bathhouse or permitted to render service in any bathhouse without the written consent of the superintendent. Managers must promptly report to the superintendent the name of any person so removed.

A neatly framed copy of the rules and regulations now in force, together with the prices of baths and attendant's fees, both separately and combined, printed in large black type on white cardboard, shall be conspicuously posted in the office of each bathhouse.

FORM USED BY PHYSICIANS FOR BATHING DIRECTIONS.

[Dr. ———, Hot Springs, Ark.]

BATHING DIRECTIONS.

Name -----
 Home address -----
 Local address -----
 Time ----- a. m. ----- p. m.
 Temperature of bath ----- °F.
 Keep patient in tub ----- minutes
 Or until temperature under tongue goes to ----- °F.
 Douche applied to -----
 No. minutes ----- temperature ----- °F.
 Douche vaginal ----- °F ----- minutes
 Vapor ----- minutes
 Apply cold sponge to head -----
 Hot room ----- minutes
 Pack ----- minutes
 Shower and needle after pack ----- minutes
 Start temperature ----- °F. Reduced to ----- °F.
 Cooling room ----- minutes
 Drink ----- cups while in tub ----- cups while in pack
 Retire to cot or bed room and lie down ----- minutes
 Additional remarks -----
 Date ----- 191-----
 By whom referred -----
 Patient's signature -----
 (In presence of doctor.) -----
 ----- M. D.
 Date -----
 Patient's signature at bathhouse -----
 Bathhouse manager's signature -----

FORM USED BY BATHHOUSE FOR DIRECTIONS FOR SPECIAL HYDROTHERAPEUTICS.

DIRECTIONS FOR SPECIAL HYDROTHERAPEUTICS.

All treatments in this department will be given only upon physician's prescription.

The price varies with the treatment prescribed. Records will be kept of effects, reactions, weight, blood pressure, pulse, respiration, and temperature, and the report sent to the physician when requested. For prescription of medicaments used in bath the physician will kindly use his own prescription blank.

Mr. _____

Immersion tub bath.....	°F.....	min.....
Medicated tub bath.....	°F.....	min.....
(a) Nauhelm.....	°F..... min.....	°F..... min.....
(c) Pine needle, etc.....	°F..... min.....	°F..... min.....
Electric tub bath.....	°F..... min.....	(a) Galvanic.....
(b) Faradic.....	min.....	(c) Sinusoidal.....
Hot-blanket pack.....	min.....	Sheet pack.....
Ice pack..... min.....	Hot glow..... min.....	Salt glow..... min.....
Simple sitz bath.....	min.....	°F..... min.....
Sitz bath and spinal douche.....	lb. pressure.....	°F..... min.....
Sitz bath and perineal douche.....	lb. pressure.....	°F..... min.....
Bidet.....	°F..... min.....	Liver spray.....
Steam cabinet.....	min.....	Hot-air cabinet.....
Electric-light cabinet, white-violet.....	min.....	min.....
Needle douche.....	lb. pressure.....	°F..... min.....
Shower douche.....	lb. pressure.....	°F..... min.....
Scotch douche.....	lb. pressure.....	°F..... min.....
Simultaneous douche.....	lb. pressure.....	°F..... min.....
Vapor douche.....	min.....	Sponge after each treatment with.....
General massage every.....	day.....	Local massage every.....
Remarks.....		

By whom referred.....

Patient's signature.....

(In presence of doctor.)

Home address.....

Local address.....

M. D.

Patient's signature at bathhouse.....

Signature of manager.....

bathhouse.

BATH PERMIT ISSUED TO PERSON NOT EMPLOYING PHYSICIAN.

[Office of the superintendent Hot Springs Reservation.]

BATH PERMIT.

No. —.

191—

In consideration of the issuing of this permit, I hereby certify that I am not under the care of a physician, and if I employ or consult any physician it will be one whose name is on the Government's registered list. I fully understand that it is a violation of the law if I bathe or attempt to bathe while treating with any nonregistered physician, and that I lay myself liable to a fine of \$100 for each offense, and this permit becomes void.

Name.....

Home town..... State.....

Stopping at.....

[Perforation.]

[Office of the superintendent Hot Springs Reservation.]

BATH PERMIT.

No. —.

NOT TRANSFERABLE.

191—

To bathhouses:

When presented in person and countersigned by _____ this will permit you to sell said person a bath ticket, he or she having employed

no physician. This permit must be returned to the superintendent's office with your daily report not later than the day next succeeding the day on which it is used.

Superintendent.
 By -----

Signature of applicant: -----

Witness: -----

----- Bathhouse.

Void if presented later than second day after date.

RULES APPROVED BY THE DEPARTMENT FOR THE GOVERNMENT OF THE FEDERAL REGISTRATION BOARD OF THE UNITED STATES RESERVATION, HOT SPRINGS, ARK., WITH AMENDMENTS UP TO JULY 25, 1912.

1. There shall be a president and secretary, elected by the board, who shall each serve for one year and until his successor is elected and qualified. Such election shall be held at the annual meeting, which shall be the first regular meeting of the board after the personnel thereof for the ensuing year has been determined by the Secretary of the Interior. Should a vacancy occur in either position by death, resignation, or otherwise, such vacancy shall be filled by the board at its first regular meeting next succeeding the date the vacancy occurs, or at a special meeting called for that purpose.

2. Three members of the board shall constitute a quorum, with full authority to transact any and all business that may come before the board.

3. Minutes of all business transacted by the board shall be reduced to writing and be copied in a record provided for the purpose, and at the next regular or special meeting the minutes of the previous meeting shall be read and approved, with such corrections, if any, as the board may consider proper to make.

4. The regular monthly meetings shall be held on the second and fourth Wednesdays of each month, at 8 o'clock p. m., and all routine business not filed with the secretary of the board at least 24 hours before the time fixed for the meeting will not be considered, but will be held for consideration until the next regular meeting; provided, however, the president of the board may waive this provision when, in his judgment, the exigencies of the case demand it. Such other meetings may be held as the board may deem necessary, prior notice thereof to be duly given.

Examination of applicants for registration shall be held quarterly, on a date to be fixed by the board. Any registered doctor hereafter dropped from the list of registered physicians will not be restored until after he successfully passes the regular examination prescribed by the board for original registration.

5. The following rules shall govern applicants for registration:

(a) To be entitled to registration applicants must be graduates of some reputable medical school legally authorized to confer the degree of doctor of medicine, or of some reputable school of osteopathy recognized by the American Osteopath Association, and must have complied with the laws of the State of Arkansas relating to the admission of physicians to the practice of medicine and surgery, or either, within said State.

(b) Applicants will be required to furnish in writing such evidence as the board may desire touching their personal history and personal and moral character and standing during the five years next preceding the date of their applications. Applicants will also be required to submit to such examination as the board may see proper to subject them touching their qualifications and knowledge of medicine and surgery and to prescribe the hot waters, provided that the names of medical officers of the Army stationed at the Army and Navy General Hospital in Hot Spring, Ark., shall be placed on the list of registered physicians without examination.

(c) An applicant who twice fails in his examinations before the Federal registration board shall not be permitted to again take the examination prescribed by the board until after the lapse of one year from the date of his last failure. No registered physician shall be permitted to associate himself in practice looking to the prescribing of the waters of the hot springs with a nonregistered physician, under penalty of having his name removed from the registered list. The name of any registered physician who shall give bath directions for the patients of a nonregistered physician shall be removed from the registered list.

6. The order for the transaction of business before the board shall be as follows:

- (a) Reading and approval of minutes of previous meeting.
- (b) Consideration of new business.
- (c) Consideration of unfinished business.
- (d) Presentation of evidence and trial of physicians charged with violation of the rules of the Secretary of the Interior "For the government of all bathhouses."
- (e) Examination of applicants for registration.
- (f) Miscellaneous business.

The foregoing rules are subject to amendment at any regular meeting of the board on the giving of 30 days' notice in writing of the proposed amendment, subject, however, to the approval of the Secretary of the Interior.

PHYSICIAN'S APPLICATION FOR REGISTRATION.

To the board of physicians appointed by the Secretary of the Interior to pass upon the qualifications and character of physicians to prescribe the waters from the Hot Springs Reservation:

1. I was born at.....
2. My preliminary education was obtained.....
(State common school or collegiate.)
.....
(If the latter, name of college and date of degree.)
3. I graduated in medicine from..... on the..... day
of....., 1.....
(Give name of college.)
4. My State certificate was issued.....
(When and where.)
5. From what county issued.....
(When.)
6. Society membership:
County.....
State.....
American Medical Association?..... Special.....
(Yes or no.)
7. I have practiced at my present location..... years, and have practiced at the following places for the years named.....

8. I now hold or have held the following positions _____
 (Give places of trust or honor held now or in the past; prices received and dispensary or college appointments.)
9. I have during the 10 years next preceding the date of this application resided at the following-named places, and was engaged in the following business: _____
 (State period of residence at each place and business engaged in while there.)
10. I am _____
 (State "general practitioner" or specialty, if any.)
11. Do you employ drummers to solicit business? _____
 (Yes or no.)
12. Do you pay commissions on any of your professional business, either directly or indirectly? _____
 (Yes or no.)
13. Have you paid commissions on any of your professional business or given anything of value, either directly or indirectly, for such purposes during the past two years? _____
 (Yes or no.)
14. If so, when did you quit, and why? _____
 (Date.)
15. If registered, will you faithfully observe the rules and regulations approved by the Secretary of the Interior regarding the use of the waters of the Hot Springs? _____
 (Yes or no.)
16. My office is _____ Street; residence _____ Street; telephone number _____

Subscribed in my presence and sworn to before me this _____ day of _____, 191____.

 Notary Public.

My commission expires _____
 Reported and examined _____

RULES FOR BATH ATTENDANTS IN THE PAY BATHHOUSES RECEIVING HOT WATER FROM THE SPRINGS ON THE HOT SPRINGS RESERVATION.

1. Bath attendants shall be required to attend such courses of instruction as may be ordered by the medical director, and upon completion thereof to take a written examination, after which successful candidates will be granted certificates as qualified attendants for such time as may be determined by the Secretary of the Interior.

2. Two consecutive failures to qualify as an attendant shall debar the applicant from further instruction, and the medical director shall order his or her discharge.

3. To entitle an applicant to a certificate as a qualified attendant a total mark of not less than 200 points shall be required, to be awarded as follows: A perfect written examination after the course of instruction shall entitle the candidate to 100 points. The medical director will award not to exceed 100 points as expressing the applicant's efficiency as noted at his inspections, and the manager of the bathhouse in which the applicant is employed at the time of examination shall award not to exceed 100 points for general aptitude.

4. Whenever the number of qualified attendants is in excess of the requirements of the service those not employed shall be entitled to have their names enrolled on a waiting list in the office of the medical director.

5. Managers are prohibited from employing as an attendant any person not holding a certificate of qualification as such whenever

there are five or more qualified attendants registered on the waiting list in the office of the medical director.

6. Instruction will be given from time to time to such persons as declare their intentions to qualify as attendants and who in the opinion of the medical director display an aptitude for the service; and upon satisfactory completion of the course they will be granted certificates as attendants.

7. Managers may suspend or discharge attendants employed by them, but shall not have authority to revoke their licenses or to prohibit their employment in other houses.

8. An attendant suspended by the medical director shall not be employed in any capacity in any bathhouse during the period of suspension.

9. An attendant discharged by the medical director shall have his or her certificate of qualification revoked and shall not again be employed in any capacity in any bathhouse for a period of six months.

10. Managers are required to report immediately by letter to the medical director the employment, suspension, resignation, or discharge of attendants.

HARRY M. HALLOCK,
Medical Director Hot Springs Reservation.

DEPARTMENT OF THE INTERIOR,
Washington, D. C.

Approved: June 11, 1912.

CLEMENT S. UCKER,
Chief Clerk and Chief Executive Officer.

CERTIFICATE REQUIRED OF ALL BATH ATTENDANTS.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
OFFICE OF MEDICAL DIRECTOR,
-----, 191

I hereby certify that I have this day examined -----
and am of the opinion that he is immune from smallpox by reason
{ of successful vaccination performed (date) ----- having recovered
from an attack of the disease.

-----, M. D.

LICENSE ISSUED TO BATH ATTENDANTS.

DEPARTMENT OF THE INTERIOR,
HOT SPRINGS RESERVATION,
Hot Springs, Ark., -----, 191

This is to certify that ----- has satisfactorily completed a course of instruction in the school for bathhouse attendants, conducted under the supervision of the medical director of the Hot Springs Reservation, and his employment as a bathhouse attendant in any of the bathhouses receiving water from the Hot Springs Reservation will be permitted for the period of one year from the date hereof, conditioned upon good behavior and strict observance of the rules and regulations for the government of the bathhouses receiving water from the Hot Springs Reservation. This license, however, may be revoked at any time for cause during the period for which given when, in the judgment of the medical director, the circumstances of the case warrant such action.

-----,
Medical Director.

No. -----

**APPLICATION FOR BATHS AT THE GOVERNMENT FREE BATH-
HOUSE.**

DEPARTMENT OF THE INTERIOR.

HOT SPRINGS RESERVATION.

Persons desiring to use the free baths are required to answer the following questions, in writing, and sign and swear to the same, giving full name and home address:

Name, -----
 Present address in Hot Springs: Street and No. -----
 Native of what country? ----- Age, ----- years.
 Have you a family? ----- How many in family? -----
 Occupation, ----- Are you able to work? -----
 Are you employed now? ----- By whom? -----
 In what capacity? ----- Do you wish to bathe for your health? -----
 With what disease are you afflicted? ----- How long afflicted? -----
 Are you under treatment of a physician at Hot Springs? ----- If so, give
 his name and address, -----
 Have you ever served in the U. S. Military or Naval Service? -----
 Do you own any real estate? ----- If so, where situate? -----
 What is the value of your personal property? \$ ----- Where located? -----
 ----- How much money have you? -----
 How long do you want to bathe? -----

The acts of Congress approved December 16, 1878 (20 Stat., 258), and March 2, 1911, restrict the use of free baths to the indigent; in other words, to persons who are poor, needy, in want, or without means of comfortable subsistence.

Act of March 2, 1911:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That only persons who are without and unable to obtain the means to pay for baths and are suffering from ailments for which bathing in the water of the Hot Springs Reservation will afford relief or effect a cure shall be permitted to bathe at the free bathhouse on the public reservation at Hot Springs, Ark., and before any person shall be permitted to bathe at the free bathhouse on the reservation he shall be required to make oath, before such officer duly authorized to administer oaths for general purposes as the superintendent of the Hot Springs Reservation shall designate, that he is without and unable to obtain the means to pay for baths, and any person desiring to bathe at the free bathhouse on the Hot Springs Reservation making a false oath as to his financial condition shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to a fine of not to exceed \$25, or 30 days' imprisonment, or both."

Do you regard yourself as an indigent person? -----

Persons accepting and using these baths are required to report to the manager once each week whether they are being benefited by the baths or not, and also when they discontinue bathing.

HOT SPRINGS, ARK., -----, 191--

Subscribed and sworn to before me this the ----- day of -----, 191--

[NOTARIAL SEAL.]

Notary Public.

**REGULATIONS OF JULY 7, 1900, FOR THE GOVERNMENT OF
THE FREE BATHHOUSE.**

These baths are provided and maintained by the United States pursuant to the requirements of the act of Congress approved December 16, 1878 (20 Stat., 258), for the use of the indigent only; neither the manager nor attendants are authorized to supply them to others.

The manager of the free bathhouse is required to enforce a strict observance of the following rules and regulations:

RULE 1. No baths will be supplied except on written applications made on blanks furnished at the office of the bathhouse, making full answers to the questions therein propounded; then if the applicant is found to be indigent (in accordance with the common acceptance of

the word), the manager will issue a ticket good for 21 baths, w may be reissued on the same application if necessary.

RULE 2. Persons using the free baths are required to main quiet and orderly deportment while in or about the bathhouse abstain from the use of tobacco, either by chewing or smoking, w in the pool rooms, dressing rooms, or office, not to scatter rags paper on the floor, or to loiter in or about the building after bath.

RULE 3. The wanton exposure of person or entering any of front rooms in a nude state, the use of loud, vulgar, or profane l guage, the use of rags, paper, soap, or any foreign substance in pool rooms is positively prohibited.

RULE 4. Persons using these baths are not allowed to stand or on or in any way interfere with the water pipes or valves or to sta on the chairs or benches. All persons entering the house are requir to clean their feet at the door and avoid as much as possible bringi dirt or mud on the floors. Boys over 5 years of age will not allowed in the female department during bathing hours.

RULE 5. Any willful or repeated violation of these rules, or a disorderly or contemptuous conduct, will subject the persons so offen ing to suspension or expulsion, at the discretion of the superintende of the reservation.

RULE 6. Neither the manager nor the Government attendan shall be allowed to receive or become responsible for any valuabl or to charge any fees for any service rendered to bathers which com within the direct line of their duty.

RULE 7. The manager is required to enforce all the foregoing rule and to maintain good order in and about the bathhouse, to see tha all indigent persons applying are supplied with baths, and to mak a written report to the superintendent each month on blank form supplied for that purpose. He may reject any application for fre baths if he has reason to believe the applicant has made false answer in his written application, and the aggrieved may appeal to the su perintendent of the reservation.

RATES AT PAY BATHHOUSES.

The following scale of rates for baths at the different bathhouse receiving water from the Hot Springs Reservation was authorized by the department in its letter dated January 17, 1912, to take effect from and including January 20, 1912. Attendants fee, \$3 additional per course:

Rates for baths.

Bathhouse.	Single bath.	Course of 21 baths.	Bathhouse.	Single bath.	Course of 21 baths.
Arlington.....	\$0.55	\$10.00	Rector.....	\$0.45	\$8.00
East nan.....	.55	10.00	Hot Springs.....	.45	8.00
Maurice.....	.55	10.00	Lamar.....	.45	8.00
Buckstaff.....	.55	10.00	Ozark Sanitorium.....	.40	7.00
Imperial.....	.55	10.00	Hale.....	.40	7.00
Park:			Palace.....	.40	7.00
Upper floor.....	.55	10.00	Magnesia.....	.40	7.00
Lower floor.....	.50	9.00	Rockafellow.....	.40	7.00
Majestic.....	.50	9.00	Alhambra.....	.40	7.00
Moody.....	.45	8.00	Ozark.....	.35	6.00
Great Northern.....	.45	8.00	Horseshoe.....	.35	6.00
St. Joseph's Infirmary.....	.45	8.00	Crystal.....	.25	4.00

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